JPRS 82713

24 January 1983

USSR Report

SCIENCE AND TECHNOLOGY POLICY

No. 9

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS 82713

24 January 1983

USSR REPORT

SCIENCE AND TECHNOLOGY POLICY

No. 9

CONTENTS

USSR ACADEMY OF SCIENCE HOLDS GENERAL MEMBERSHIP MEETING

Moscow APN DAILY REVIEW in English 9 Dec 82 pp 1-4

[Article entitled: "The Summits of Soviet Science; General Membership to Mark the 60th Anniversary of the USSR."]

[Text] Members of this capital's scientific community and delegations from the republican academies of sciences assembled for a general membership meeting in Moscow on December 8 to mark the 60th anniversary of the formation of the USSR in a mood of great responsibility in front of the nation and the Party.

The meeting was also attended by the delegations from the academies of sciences of the People's Republic of Bulgaria, Cuba, the Czechoslovak Socialist Republic, the German Democratic Republic, the Hungarian People's Republic, the Korean People's Democratic Republic, the Mongolian People's Republic, the Polish People's Republic, the Socialist Republic of Vietnam, the Socialist Republic of Romania, and the Socialist Federative Republic of Yugoslavia.

The audience cheered K. U. Chernenko, B. N. Ponomarev and M. V. Zimyanin as they mounted the platform in company of the leaders of the USSR Academy of Sciences and of the republican academies, and the presidents of the academies of the socialist countries.

With great enthusiasm, the meeting elected its honorary presidium composed of the Politburo of the Central Committee of the CPSU.

The audience observed a minute's silence in tribute to the memory of Leonid Ilyich Brezhnev, greatest politican and statesman of modern times, who showed constant concern for the promotion of science and the consolidation of this country's scientific potential.

An opening address was by Academician A. P. Aleksandrov, President of the USSR Academy of Sciences.

Academician V. A. Kotel'nikov, Vice-President of the USSR Academy of Sciences, delivered a report on "The 60th Anniversary of the Formation of the USSR and the Development of Soviet Science."

The 60th anniversary of our Soviet multinational state, he said, is a clear indication of the triumph of the Leninist nationalities policy of the Communist Party and the historic achievements of Socialism.

Science in this country has developed by the principle of a federal institution which was enunciated and applied soon after the victory of the Great October Revolution. Lenin's ideas left a deep imprint on the subsequent activities of the Academy and on the development of all Soviet science.

Science in the Soviet Union has major accomplishments to its credit which the people can well be proud of. Remarkable achievements in space exploration have been an epochal product, indeed, of Soviet science and technology.

Fundamental research into the atomic nucleus which was launched in this country before the war enabled it to lay the groundwork within a brief space of time for the peaceful employment of the energy of the atom.

The progress of science in the USSR, the Academician said, has played a great part in the development of our aviation, radio electronics, chemistry, geology, medicine, agriculture, and many other areas in which we, in many cases, have been following novel ways.

Social sciences, making up as they do the scientific base for the guidance of the development of Soviet society, have attained a high level of achievement. Our international co-operation, above all, with the scientific institutions, scholars and scientists of the sister socialist nations, has been gaining in scale and strength from year to year. The Academy of Sciences of the USSR is carrying on scientific co-operation with research establishments, scientists and scholars of 100-odd countries.

Soviet scientists invariably stand, in common with the Party and our entire people, for peace and co-operation among all nations, irrespective of their social systems.

A broad picture of research in this country was presented by presidents of the Academies of Sciences of the Union Republics B. E. Paton, N. A. Borisevich, A. S. Sadykov, A. M. Kunayev, E. K. Kharadze, J. J. Matulis, A. A. Zhuchenko, A. K. Malmeister, M. I. Imanaliyev, M. S. Asimov, V. A. Ambartsumyan, A. G. Babayev, and also by acting Vice-President of the Academy of Sciences of the Azerbaijan SSR N. A. Guliyev and Vice-President of the Academy of Sciences of the Estonian SSR A. A. Keerna. They emphasized that the setting up of the Republican Academies of Sciences and their fast progress in the years of Soviet government were a result of the formation of the Union of Soviet Socialist Republics 60 years ago, a result of the disinterested assistance of the Soviet state, Russian scientists, and the fraternal mutual support of the Soviet Republics.

Each of the Republican Academies of Sciences which speakers described has its own inimitable 'face' which is determined in many respects by the potentialities and requirements of the economy of a given Republic. The traditional pursuits of scientists of the Ukraine, for example, are close to the tasks of a number of important branches of industry, such as metallurgy and metal-working.

Major research findings in Belorussia have been made in the field of physics and mathematics, technology and biology. Suffice it to mention the theory of optical properties of crystals, the methods of research into complex molecules, the development of smoothly tunable laser and other achievements of scientists of the republics.

Speakers pointed out, among other things, the results of research in the field of bio-organic chemistry, the biology and chemistry of cotton done in institutes of the Academy of Sciences of Uzbekistan, and research work traditional with scientists of Kazakhstan connected with the mining and conversion of minerals; achievements made by the Georgian school of mathematics, and also by physiologists of Georgia; research findings of Azerbaijan scientists, who have developed advanced processes for petrochemistry; and research findings of Lithuanian physicists, who have revealed the basic properties of semiconductors.

The Moldavian academic institutes play an active role in developing the republic's agro-industrial complex; the scientists of Latvia have made their contribution to magnetohydrodynamics and the theory of organic synthesis. Kirghizian scientists are taking an active part in perfecting the equipment for the mining industry. Great practical assistance to builders in seismically dangerous areas is rendered by scientists from the Academy of Sciences of Tajikistan. The researches of Armenian astrophysicists, of Turkmen scientists who have created the scientific foundation for developing arid lands, and of the Estonian specialists in aero-physics and crystal spectroscopy are highly rated in the scientific world.

The participants in the meeting with great enthusiasm sent a letter of congratulations to the CPSU Central Committee.

On behalf of millions of scientific workers, they expressed their ardent support for the decisions of the November (1982) Plenary Meeting of the CPSU Central Committee and unanimously supported the principles and conclusions given in the speech by Y. V. Andropov at the Plenary Meeting of the CPSU Central Committee. The scientists assured the CPSU Central Committee, the Presidium of the Supreme Soviet of the USSR and the Council of Ministers of the USSR that they would do everything they can to implement the historic plans of the Leninist Party in the name of the triumph of communism and peace on earth.

(Sovetskaya Rossia, December 9. In full.)

ALEKSANDROV SPEECH ON S&T PRIZE WINNERS

Moscow APN DAILY REVIEW in English 10 Nov 82 pp 1-5

[Article by Academician A. Aleksandrov, chairman, Committee on USSR Lenin and State Prizes for Science and Technology, Council of Minister of the USSR: "Wide Ranging Quest."]

[Text] It give me extra pleasure at this time of celebrations to congratulate the new winnders of the USSR State Prizes for 1982. Among them, there are representatives of Russian and the Ukraine, Belorussia and Kazakhstan, Uzbekistan and Georgia, Azerbaijan and Turkmenia, Latvia and Tadzhikistan... This is a pointer to the great creative potential of all the constituent republics of the multi-ethnic Soviet state.

It is gratifying to note progress in pure research as basic to applied development studies.

Notable headway has been made in physics and mathematics. One development of great scientific value is a high-precision theory of the motion of the inner planets of the solar system--Mercury, Venus, Earth and Mars. It is used to resolve a variety of problems relating to inter-planetary travel. Good coordination of experimental and estimated data has made it possible to try out some inferences from the general theory of relativity with astronomical methods. Particular cases of theory have been used for navigating the automatic Venus-11 and Venus-12 stations and for radiolocation of planets. This line of research has been carried out at the M. V. Keldysh Institute of Applied Mathematics as well as the Institutes of Radio-Engineering and Electronics and Theoretical Astronomy of the USSR Academy of Sciences.

The findings of research carried out under the program of "Prediction, Detection and Investigation of Slotless Semiconductors and Exciton Phases" have been taken as a guide for the development of photodetectors within the infra-red waveband, changeable frequency lasers, and active elements in solid-state electronics.

The research series known as "Dynamics of Current Layers and Solar Activity" has served to investigate some of the most important developments generated by solar activity. This makes it possible to lay the ground for physically-substantiated forecasting of solar flares which is a matter of great practical value.

An outstanding achievement of modern physics--the discovery of holography--has given rise to some new trends in optics, quantum electronics, the theory of information, to mention just a few. A paper on "Physical Foundations of Dynamic Holography and New Methods of Converting the Spatial Structure of Light Beams" has dealt with the development of yet another trend in science--dynamic holography or holography in real time scale, one of much promise for various areas of science and engineering.

A group of mathematicians of the Leningrad and Siberian divisions of the USSR Academy of Sciences worked out a set of methods that are expected to increase considerably the credibility of interpretation of seismic data and efficiency of seismic research.

Soviet chemists have made a sizeable contribution both to science and practice. A series of experiments with a view to the chemical fixing of molecular nitrogen with compounds of transition metals has been carried out by research groups of the Institutes of Elementary Organic Compounds and Chemical Physics of the USSR Academy of Sciences. It has been established that nitrogen, which had for a long time been considered as an inert gas, is capable of entering into diverse reactions under the impact of transition metals, to form inorganic and organic compounds. This line of research has produced two scientific discoveries. One more group of chemical scientists are credited with having devised and put into commercial use a highly efficient process and equipment for the production of high-quality polystyrene.

Prizes have been awarded for achievements in geological research. Geophysical methods of probing deep and super-deep wells have an important part to play in mineral surveying and prospecting. It has been necessary to develop fundamentally novel methods to prevent the metal layer of well casings interfering with geological prospecting. The group of researchers engaged in this line have laid down some physical principles by which to develop the methods and equipment for locating the pre-well zone with a beam either of neutrons or sound energy. These methods have been tried out and applied in various oil-bearing regions, and found to yield a saving running into tens of millions of roubles. One prize winning project has been the South Yakutian coal-mining and mineral-producing centre.

The research studies of Soviet biologists investigating the structure and genetics of RNA-polymers have also earned high recognition.

Prizes have been awarded for important achievements in social sciences. These include a six-volume work "Essays on Russian Culture of the 13th-17th Centuries" which gives a comprehensive analysis of the major processes in the history of Russian medieval culture, showing the wealth and diversity of materials and spiritual areas of its development, and the importance of its contribution to the history of European and world culture.

A group of researchers have produced a two-volume "Russian Grammar", having investigated the modern state of the grammatical structure of the Russian literary language in a wide range of style and form. The book reflects the changes which have taken place in the language, and records all modern grammatical variations along with supplying recommendations for their proper use.

A seven-volume "History of the Socialist Economy of the USSR" is a fundamental work summing up the experience of socialist and communist construction in our country. It considers the economic strategy and tactics of the CPSU and the Soviet state in the process of building Socialism and Communism, and offers a clear insight into the creative activities of the working people of the USSR.

The volumes bring out the Soviet Union's role in the economic development of the socialist community and its economic links with capitalist and developing countries.

Soviet medical scientists have a number of outstanding prize-winning achievements to their credit. These include a series of research studies on the geographic pathology and epidemiology of cardio-vascular, oncological, and nervous diseases, a new generation of diagnosing instruments--polyanalysers with in-built calculators. Unmatched rehabilitative operations have been developed and applied in actual practice by health services to treat patients suffering from congenitial anomalies of kidneys and the urinary duct. A series of research studies has been carried out to investigate the variability of tubercular agents through a process of chemical therapy. The results thus obtained make it possible to reduce this grave morbidity by a considerable margin. Some methods of rehabilitative microsurgery involved in traumatic finger and hand amputation have also been devised.

In animal husbandry, prizes have been awarded for the breeding of new karakul-bearing sheep. Unmatched karakul colorings have been obtained for the first time in the world-wide practice of karakul-sheep breeding. A pedigree flock with an assured prospect for large-scale development of color-karakul sheep breeding in this country has been created. Another group of research scientists have suggested and applied aerosol forms of chemical and biological preparations for the preventive and curative treatment of infectious animal diseases.

The program-governed approach to the resolution of major scientific, technological and economic problems thorugh a union of science and production is being applied on a widening scale. The fulfillment of a number of such programs, connected with the restructuring of production and management, based on the application of up-to-date machinery and technologists, has been highly appreciated. Forward-looking technologies and automatic equipment for the flowline production of solid-rolled railray wheels can be taken as a case in point.

Large-scale automated production of such wheels has been launched, based on a new technology of rolling and specialized equipment. Two wheel-rolling shops at the Vyksunsk Iron-and-Steel Works and the Nizhne-Dneprovsk Tube-Rolling Mill are turning out 1,300,000 wheels a year. The novelty of the technical solutions involved has been acknowledged in 46 certificates of authorship.

Computer technology has struck root, solid and fast. Computers are being upgraded all the time, while the area of their application is being extended, notably, into that of automating research and production processes. One type of computer so designed is known as the "Elektronika" generation which has won a prize for the designers who have developed it and put it into full-scale use.

Prizes have been awarded to research scientists who have developed high-efficiency technologies of making paper and board out of hardwood at the Syktyvkar Timber Industry Complex and at the Kotlas Pulp-and-Paper Mills. These technologies have considerably increased output.

USSR State Prizes for 1982 have been awarded to the authors of 37 research studies, 15 of them dealing with science, and 22 with technology. Many of these have already been described in the public debate in the columns of Pravda, and therefore, there is no point in detailing each and every one of them. One thing they have in common is that they all are striking landmarks of scientific and technological progress, attesting to the high efficiency of the strategy of integrating science with production, as outlined by the 26th Congress of the CPSU.

Four prizes have been awarded to the authors of outstanding textbooks, three for universities, and one for vocational training.

The awarding of USSR State Prizes for 1982, the year of national celebrations, is a striking indication of the growing contribution of national science and technology towards creating the material and technical base of communism.

(Pravda, November 7. In full.)

SOVIET LICENSES

Moscow APN DAILY REVIEW in English 24 Dec 82 pp 1-3

[Article entitled: Soviet Licenses."]

> [Text] Some Soviet enterprises in various industries use machinery and methods under foreign licenses. This stimulates, in its turn, the interest of foreign industrailists in Soviet scientific and engineering ideas. Soviet scientific and technological achievements attract the great attention of numerous foreign companies and Soviet licenses are in growing demand abroad. Below is the interview which Nedelya's correspondent S. Serebryakov received from B. Kurakin, Director General of the Litsenzintorg All-Union Export and Import Association.

Question: Will you kindly tell us something about the activities of your Association?

Answer: We sold our first license exactly 20 years ago. It went to Kobe Steel of Japan which received the right to manufacture vertical continuel steel casting units. That agreement came to symbolize the stability of our relations with partners- some time later Kobe Steel signed another agreement with us.

At present the Association unites nine Soviet specialized export and import firms. Together with industrial and research organizations, they carry out operations connected with the mutually advantageous exchange of scientific and engineering ideas on a commercial basis. We have contacts with more than 2,000 firms and organizations of many countries. We sell Soviet licenses covering all key sectors of science and technology. To guarantee their effective introduction, inventions undergo semi-industrial trials. Thus, Schloemann-Siemag of West Germany bought a new Soviet pipe cold rolling technique and built a pilot plant to Soviet documentation. Three years after buying a license on Soviet surgical suturers, the United States put out the first consignment of these instruments. Today you can buy Russian rye bread in Finland which makes it under a Soviet license.

Our Association operates in different fields. To get an idea of how we employ international industrial cooperation, let us return, mentally, back to the pre-Olympic year when we signed an agreement with Adidas of West Germany. The Soviet Union received right to produce Adidas sport footwear. Some material for this purpose comes from West Germany which receives 15 percent of the Soviet output. The Adidas sales manager said that this cooperation was beneficial to both sides. This year Soviet plants produced, under a license from Stetter of West Germany, mobile concrete pumps that can feed mortar to a height of up to 26 meters. In its turn, Stetter received Soviet-made drum mixers and other products.

Litsenzintorg joined efforts with Italimpianti to establish the Technicon society in Genoa, and with Ferrostaal to set up the Technounion society in Essen. These joint companies cut down the time necessary to adapt Soviet technologies to the requirements of foreign clients. Thus, to fulfill a Brazilian order for Technicon's design and delivery of a coke dry slaking unit, several noted Soviet experts supervised the blueprinting done by Italians in Genoa. This allowed us to develop a more efficient unit to meet the specifications of the client and the local conditions of operation.

The past decade has seen the formation of "the clubs of license holders," or regular conferences arranged for the buyers of Soviet licenses to exchange information and knowhow. Licenses on blast furnace evaporation cooling facilities were obtained by a number of companies in Europe and also in Australia, Japan and the United States. To exchange scientific and technical information on achievements in this field "a club of license holders" met on three occasions, in Donetsk, Tokyo and Oberhausen.

Mutual assistance, not rivalry, is our motto in various fields, particularly in the trials of crude products, machinery, etc.

Question: What is the most interesting agreement among those signed recently?

Answer: For many years Tervakoski Oy has supplied us with capacitor paper. Last year it began to buy such paper from us. Our Association and Tervakoski Oy signed an agreement on the Soviet technology and making capacitor electric insulation paper. Among the interesting technical schemes is cutter-loader K-103 designed to work thin coal seams. Westfalia Lunen of West Germany bought a Soviet license for making these machines. We also signed a contract with McDermott of the United States covering the welding of major sea pipelines. Last spring we concluded an agreement with the Indian Space Research Organization to launch a satellite for the remote sounding of the Earth. Services connected with the peaceful exploration of space were extended on a commerical basis.

Question: Scientific and technological ideas are omnipresent. They yield fruits sometimes unexpected, in all fields of endeavor. In many capitalist cities people breath air polluted by industry. We know that this country is doing much to preserve the environment. I can imagine that on one fine day Litsenzintorg, whose portfolio keeps growing, will be able to offer its clients a license to alpine-clear air. Do you think it is sheer fantasy?

Answer: I shouldn't say this. Perhaps you do not realize how close you are to reality. We devote much attention to the exchange of technological ideas pertaining to environmental protection. Thus, a Soviet method of making nonferrous metals, KIVTSET, helps combat air pollution with sulphurous gas. We also have licenses for new instruments to gauge the purity of ground, water and air. Foreign specialists and buyers show a great interest in the USSR's efforts to tackle the various aspects of the protection of the biosphere.

(Nedelya No. 48, 1982)

METHODS DISCUSSED FOR ACCELERATING ADOPTION OF SCIENTIFIC ACHIEVEMENTS

Moscow EKONOMICHESKIYE NAUKI in Russian No 7, Jul 82 pp 105-107

[Article by V. Oligin-Nesterov, professor and doctor of economic sciences and Yu. Agishev, candidate of economic sciences (Sverdlovsk): "Expenditures for Adopting Scientific Developments in the 'Science-Production' System."]

[Text] The question of who should compensate for the expenses to adopt the results of scientific research in production often arises when organizational and economic measures are being taken to accelerate and improve the effectiveness of scientific and technical progress. This question is particularly important for higher education institutions which, as a rule, do not have the appropriate structural design and production base necessary to adopt the results of university science into production. Therefore, much scientific research work that has been completed lays on bookshelves for years waiting its turn to be adopted and as a result becomes outdated. And even the work that is planned to be adopted is not always done on schedule. In 1978, 677 scientific research projects in higher education institutions that were to be adopted according to the plan were not implemented. In the Department for Adopting Scientific Achievements under the USSR Ministry of Higher Education Institutions about 500 projects awaited a decision by the commission in the USSR State Committee for Science and Technology which is charged with reviewing and recommending them to USSR Gosplan or sector ministries for adoption. In 1979 the commission reviewed only 40 projects.[1]

Various ways of solving this problem are being tried--concluding an economic agreement with industrial enterprises or a creative cooperation agreement between scientists and production workers that specifies that work be done to adopt scientific achievements, etc. The primary deficiency in such solutions to the problem is the lack of a firm foundation that makes it possible to regulate and, chiefly, to accelerate the process of adoption according to a planned procedure. Difficulties also arise during adoption of the results of scientific developments in production by the understandable attempt of enterprises to, first of all, complete the principal planned tasks, by the collectives' uncertainty of whether the expected results of NTP [scientific and technical progress] are attainable in practice and most often by a lack of the funds required.

An adoption of the results of scientific research in practice encompasses the entire "science-production" system in stages. In addition to this adopting scientific achievements is a special independent process that is represented in the expenditures for production and that exerts a certain effect on its results. In

practice it is difficult to disclose who is obligated to bear precisely what expenses for implementing this or that stage of adopting scientific achievements since expenditures are not allocated for these purposes by the appropriate normative documents.

Beginning with the 11th Five-Year Plan it is specified that indicators for the economic effect of taking scientific and technical measures are to be approved in the five-year plans by the industrial ministries, associations and enterprises.[2] Under these conditions estimating expenditures for adopting the results of scientific research in production is acquiring special urgency. Being an element of the total expenses for production they, in turn, act as an adoption cost (IV)--the specific sum total of expenditures that are made by subdivisions in the sphere of science and production and that are associated with financing work for adopting the results of scientific research in economic practice.

It is also specified that expenses for scientific research goals and for assimilating new technology be combined on a standard basis in the system of measures for further improving the economic mechanism.[3] Such a combination was brought about by the necessity of eliminatingthe break in the complete cycle of work for adopting the achievements of NTP. With this goal a single fund for developing science and technology must be formed from profits in all the industrial ministries.

A new technique, new technological processes and measures for saving and organizing production are the object in adopting scientific and technical achievements and the subject is the appropriate scientific and production subdivisions that are part of the enterprises, organizations, associations, combines, ministries, state committees and other links in the management of a scientific or technical process. The process of adoption manifests itself in various specific organizational forms; specifically theses are the associations of independent scientific organizations with production on the basis of agreements (economic, creative cooperation, etc.), the union of subdivisions in the spheres of science and production into a single national economic complex, i.e. the formation of a scientific production association (NPO).

The primary stages in adopting a product of science in production are: preparatory, including drawing up forecasts, adoption plans and other preparatory work; experimental; industrial experimental; serial. The stages of adoption determine the most important elements of the IV, the total amount of which is expressed by the demand for labor means and needs, the costs of labor and financial resources at all stages of this process and in the end are reflected in the cost of the product.

Grouping the IV should be done on the basis of the total original methodological preconditions that are used when classifying production and management costs.[4] The IVs are grouped according to content, their role in scientific and production activity, the method of relating them to the cost of the product, etc. By their content IVs are the sum total of the expenditures for living and past (embodied) labor. Along with this, expenditures for embodied labor are represented by object conditions to maintain the adoption process, material and technological means, and various information carriers (scientific, economic, and patent-technical). By their purpose IVs can be allocated toward improving the technical level of production and perfecting its organization, toward changing the volume of products and improving their quality, toward improving the use of natural resources and protecting the environment and toward other progressive changes.

In order to determine the kinds of expenditures for adopting scientific achievements at each stage their sum total must be distinguished in production expenses and the total expenses for science. However, in practice a statistical estimate of the expenses for adopting scientific achievements and apportioning them among the stages is lacking. IVs are not distinguished from the total structure of expenditures for science. Thus, the point being made concerns the problem that still remains to be solved through the highly active participation of economists.

In economic practice the activities of organizations in the sphere of science for adopting scientific achievements are not limited to carrying out functions that are of a purely scientific nature; they also include several production functions. The same can be said about industrial enterprises. Therefore, the total expenditures for adopting scientific achievements cannot be born by just the science sphere or industrial enterprises. Some kind of justified distribution of the above expenditures among all the participants associated with the process of implementing them is required.

Under present conditions a further differentiation of expenditures for adopting scientific and technical results can be observed in the total cost structure of industrial enterprises and scientific organizations. The total amount of expenditures for scientific research work is determined for a USSR ministry or department and a union republic on the basis of estimated financing computations for combined items.[5] With this system expenditures of funds that are associated with scientists participating in the concluding stages of implementing scientific achievements are not reflected. And the question--from whose sources should the adoption be financed?--continues to remain open.

Expenditures for the subdivisions in the sphere of science are usually included in the total structure of expenses for science where basic and applied research and also work to develop an innovation are distinguished. With this system the amount of IV, as has already been noted, is hard to distinguish from the total sum of production expenses. Therefore, it is very important to form an idea of the true size of the expenditures for adopting the joint product of science in the national economy and to obtain a clear answer to the question posed as to the sources for covering the IV.

Apportioning expenditures among the stages of adoption should be done while taking into consideration the specific nature of the subject and object of adopting the achievements of science. For example, when reconstructing production assets, and in a number of other cases of adopting organizational and economic innovations expenses for experimental work and for industrial experimental assimilation can be completely nonexistent.

The formation of an IV requires scientifically justified norms for using labor and material resources depending on the duration of the adoption process. Under the conditions for further improving the economic mechanism the existence of these norms is especially important since they intensify material incentives for scientific and production activity and heighten the interest of labor collectives to efficiently use existing sources of IVs. At the present time such sources are the state budget, bank credit, and the personal funds of enterprises and organizations. As soon as the IVs are associated with expenditures for labor that are

of a production nature they will act as the necessary link in the systematic implementation of socially expanded reproduction that will provide accelerated scientific and technical progress.

A solution to the important general problems of sources of financing for IVs and of apportioning these expenditures among the appropriate organizations and enterprises will make it possible to impart clarity, in particular, to the pressing problems of the interrelationship between the IV and the cost indicator. Only two items that partially specify expenses for adopting scientific achievements are distinguished among the calculated items that make up the cost of a product in the statute now in effect.[6]

Equating expenditures for adopting scientific and technical innovations with the results obtained testifies to the advantages of an NPO--they spend less funds for adopting a single innovation and obtain from such an adoption a larger economic effect on the average in comparison to other associations and enterprises. With the formation of an NPO the timetables for adopting scientific and technical innovations in production are reduced on the average by a factor of 1.5 to 2. However, even under the conditions for the activities of new organizational forms of managing scientific and technical progress difficulties associated with planning and estimating expenses for adopting the results of scientific research in production have not been eliminated. As an analysis has shown an evaluation of these expenses and the bookkeeping for it is done according to the indicators for the activity of scientific and production subdivisions but the data on the complete expenses are scattered among the numerous expenditure items for these subdivisions. Therefore, the value of the expense indicator for adopting scientific achievements (especially new technological processes, means of mechanization and automation and methods of organizing production and labor) is understated in the system of planning and evaluating the effectiveness of scientific and technical progress.

Calculating the current IV for each project to adopt the achievements of science in production presents special difficulty. It would have been expedient to make such a calculation by considering the specific nature of the subject and object at each stage of adopting the results of scientific research in production according to the expenditure items and elements or according to the reported cost of a product unit manufactured with the aid of the new technology.[7]

The effectiveness of scientific and technical progress and the quality of the work of the organizations and enterprises depends a great deal on the indicators that are associated with the IV and most of all on those that are oriented toward the final national economic results of scientific and production activity. Therefore, the planning indicator for the economic effectiveness of scientific and technical measures and the standard for forming a single fund for developing science and technology should prove to have a substantial effect on the development and adoption of scientific and technical achievements. When considering the social consequences from implementing the achievements of scientific and technical progress the economic effect should be the criteria for selecting a scientific product as an object to be adopted.

As experience has shown from the work of the cost accounting subdivisions in individual higher education institutions and in production associations in the Urals

an improvement in forming and using expenses for adopting the results of scientific research in production will become the necessary condition for accelerating and improving the effectiveness of scientific and technical progress. Many possibilities for further improving cost accounting in the area of scientific and production activity are contained in completing the work for adopting the achievements of science into production on the basis of supply authorizations. Further expanded use of this form of economic agreements depends on the growth of the initiative and creative activeness of scientific and production collectives and also on the appropriate planning agencies and credit and financing services. Those collectives that adopt and disseminate fundamental innovations, which are usually a result of revolutionary processes in the development of science and technology, should find themselves in a preferential position. Along with this it is necessary to stipulate specific measures that are aimed at improving the financing mechanism for managing the development of science, technology and production. In this regard the necessity of using a special purpose program method of planning that will make it possible to substantially reduce the time between the moment that a scientific idea is born and its fruition attracts attention Along with reducing the timetables complete special purpose programs have, in particular, the virtue that they make it possible to better consider the final aims and technical and economic results of the scientific and production activities of labor collectives.

FOOTNOTES

1. See EKONOMICHESKAYA GAZETA, 1980, No 4, p 17.

2. See "Concerning a Further Improvement of the Economic Mechanism and the Goals for Party and State Agencies," CPSU Central Committee decree dated 12 July 1979. "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality," CPSU Central Committee and USSR Council of Ministers' decree dated 12 July 1979. Moscow, 1979, p 15.

3. Ibid., p 52.

4. For more detail see V. I. Oligin-Nesterov, "The Effectiveness of Administrative Work in Industrial Production." Moscow, 1965, p 82.

5. See "Systematic Instructions for Drawing Up State Plans for Economic and Social Development in the USSR," Moscow, 1980, p 30.

6. See "Pure Standard Production. Systematic Instructions Concerning the Procedure for Working Out and Using the Pure Production (Standard) Indicator in Planning," EKONOMICHESKAYA GAZETA 1979, No 41, p 8.

7. For more on this see B. Zaytsev, "Planning the Economic Effect," EKONOMICHESKAYA GAZETA, 1979, No 49, p 18.

9495
CSO: 1814/8

BETTER RESULTS FROM DEVELOPMENT OF TECHNICAL EQUIPMENT

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 7, Jul 82 pp 43-48

[Article by I. Prodius, candidate of economic sciences, and T. Pyshnyak (Odessa): "Improving the Results of the Labor of Developers of New Technical Equipment"]

[Text] Branch scientific research institutes and design bureaus are important units which solve problems related to direct integration of science and production. The most important indicators of the results of the labor of workers in scientific research institutes and design bureaus, in our opinion, are the following:

the development of the most effective directions for scientific and technical progress in the branch;

reduction of the duration of the cycle "research-production";

the number of introduced developments and their actual economic effect;

improvement of the quality of developments and the quality of the labor of the developers.

The main factors affecting the utilization of the scientific and technical potential of the organization and, consequently, the results of the activity of the developers of new technical equipment include organizational forms of the link between science and production, the formation of a thematic plan, the system for evaluating the scientific and technical activity of the organization and the system for material and moral incentives.

In the organizational forms of the link between science and production at the level of production associations and large enterprises, special attention should be given to experimental industries (shops, sections and installations). It is precisely here that the basis is laid for increasing the efficiency and quality of the work of the entire association. Experimental production integrates, on the one hand, the results of the developments, and, on the other, the conditions and methods for the assimilation of these results in industry. And frequently scientific research institutes and design bureaus do not have an adequate experimental base.

An analysis of the experimental base of the scientific research institutes and design bureaus located in Odessa showed that in a considerable majority of the design organizations the experimental and testing industries are small and do not satisfy the needs of the designers and developers. In certain organizations there is no experimental base at all. As a result, a considerable proportion of the design and technological developments require "finishing" during the process of their industrial introduction. This, on the one hand, gives rise to large additional labor and material expenditures and, on the other hand, increases the duration of the reproduction cycle "research--production." In recent years a number of measures have been taken to strengthen the experimental base of branch scientific research institutes and design bureaus. But even the simplist calculations show that the creation of large experimental subdivisions at each branch institute is practically impossible and economically inexpedient. For the creation of experimental models of technical equipment requires the manufacture of various forms, parts, components and instruments in single units, which predetermines the universal nature of the experimental plant and the low level of utilization of its equipment. It seems to us that it would be more efficient to create centralized testing and experimental industries which serve the scientific research institutes and design bureaus of a particular branch depending on their territorial location.

An extremely effective form of organizatin the cycle "research-production" is to create scientific production associations, which means a changeover from the traditional separation of scientific research and design organizations into the various stages of the process of "research-production" to a unified organizational form within whose framework problems are solved in the main stages of the creation of new technical equipment. The experience of the Odessa Kislorodmash, Pishchepromavtomatika and other scientific production associations shows that the time periods for the creation of models of new technical equipment here are reduced to approximately two-thirds-one-half the previous level.

The effectiveness of new organizational forms for carrying out research and developments depends to a considerable degree on the existing system of stimulation. An analysis we conducted showed that the proportion of bonuses for the introduction of new technical equipment among engineering and technical personnel of Odessa machine building enterprises amounts to only 10-15 percent of the overall sum of bonuses, and the rest are awarded for the fulfillment of planning indicators. But if the production plan is not fulfilled, even if the assignments for new technical equipment are fulfilled, the collective does not receive incentive funds. Moreover, at the plant and scientific research institute that are part of the same scientific production association the incentives are used for the achievement of various goals. At the plant they are mainly for the fulfillment of the production plan, and at the institute--for the fulfillment of assignments for new technical equipment. It is clear that under these conditions the plant workers do not hasten to introduce new technical equipment. Therefore in recent years there have been many experiments for the creation of a unified material incentive fund for workers of the association. Its essence consists in that the workers of the subdivisions engaged in research and technical preparation for the production of new technical equipment are given some of their bonuses in terms of indicators of the operation of the enterprise as a whole. The practice of the Zaporozhtransformator

association and others shows that the creation of a unified material incentive fund contributes to increasing the motivation of all categories of workers for achieving good results of the activity of the association as a whole and stimulates better results of the labor of the developers of new technical equipment.

The level of the results of the activity of scientific institutes and design bureaus depends on the selection of subject matter. Recently the literature has considered fairly extensively the question of forming an optimal list of orders for development organizations by using various mathematical methods, taking into account the labor, material and other resources. Mathematical formulas are being developed which can be used to select from a multitude of themes those whose fulfillment will produce the greatest results from the activity of the organization. Speaking of the importance of the task that is set, it should be noted that the main shortcoming is the lack of a sufficient number of variants of the draft of the plan. The existing practice amounts to the following: On the basis of suggestions from managers of the groups, sectors and divisions, a draft of the thematic plan for the organization is formulated and submitted to the ministry. The ministry has no choice since there is only one variant to the plan.

Many subjects are introduced into the program for the development of science and technology on the initiative of the scientific research institutes and design bureaus. Another part of the subject matter of branch scientific research institutes and design bureaus is carried out under economic agreements with the enterprises. The plan for financing establishes the amount for which the orders must be filled. Sometimes the developing organization is forced to agree to proposals from the enterprises even though the subject matter is not always suitable in terms of its prospects. The proportion of proposals initiated by scientific research workers and experimental design personnel is usually not great. Thus in the NIITKriogenmash during all the years of the 10th Five-Year Plan it did not exceed 7.6 percent, and the special design bureau for diamond boring machines (SKBARS)--6.5 percent. In terms of financing the developments that are initiated by the institute for th emost part do not exceed 10-15 percent of the overall volume of its work.

The existing practice leads to a situation where the draft of the thematic plan has only one variant and does not have to be broken down into the usual areas of work. This is explained primarily by the fact that the content of the plans corresponds to the existing structure of the institute, the established specialization of its workers and the selected areas of its work. In the Ukrainian institute of machine tools and instruments (UkrNIISII), the special design bureau for special machine tools (SKB SS) and the special design bureau for precision machine tools (SKB PS) during the years of the 10th Five-Year Plan there were no changes in the organizationl structure which were related to changes in the subject matter. There is no doubt that this has a positive aspect--it is possible to take full advantage of the experience and knowledge of the specialists. On the other hand, the natural desire to continue developments in the accustomed subject areas makes the utilization of progressive new areas of scientific achievements less productive.

In our opinion the system of responsibility for the selection of subject matter should be based on the responsibility of those who initiate particular subjects to be included in the plan. It is necessary to indicate clearly on what basis and at whose suggestion a subject was included in the plan. The development in addition to this of a system of fines in the form of deductions from bonuses will help to increase the responsibility of organizations and individual workers who participate in the formation of the plan, will help to create a barrier against less important subjects and will increase the motivation of both the performers of the work and the client to develop and introduce highly efficient technical equipment. But the level of the results of the activity of scientific research institutes and design bureaus depends on more than just the selection of the subject matter.. Science is changing over from extensive to intensive development. Increased results depend more and more on efficient utilization of the labor of the workers who are already working in the organization. Under conditions whereby no increase in the number of personnel in the sphere of science is envisioned it becomes especailly important to evaluate the activity of individual scientific organizations, their subdivisions and individual workers. The evaluation of this activity is a most important economic lever for increasing the results of the work of branch scientific research institutes and design bureaus. This is precisely why the practice of evaluating the activity of scientific research institutes and design bureaus has developed a considerable number of the most varied and sometimes contradictory methods and specific indicators for evaluating the activity of scientific research institutes and design bureaus.

A special role is played by form figure 2-nt (NPK)--"Report on the Fulfillment of Scientific Research, Planning, Design and Technological Work." It gives information about the number of themes and the stages, time periods for the work and expenditures on its fulfillment. But from this reporting it is difficult to evaluate the efficiency of the work of the developing organizations. The fact is that although the planned and actual times for the beginning and completion of the work usually coincide, this does not mean that all of the projects are fulfilled on time. There is a fairly widespread practice of changing the time periods for the performance of work, which is usually justified by objective factors. Then it is necessary to coordinate this change with the client and nobody is responsible for this change. Such projects are not included in the reports of the organization.

A fairly complete idea of the various aspects of the activity of scientific research institutes and design bureaus can be gleaned from the "Report on the Activity of Scientific Research, Planning and Design, and Technological Organizations," (one-time form of accounting) which consists of five sections. But the indicators are absolute and do not characterize changes that have taken place during the report period as compared to the base one. Comparing, for example, such an indicator as the number of patents obtained during 1979 in the SKB SS (39) and the SKB Poligrafmash (20), one could draw the conclusion that the absolute value of this indicator is greater for the SKB SS. But this accounting form does not reflect the fact that in 1978 the SKB SS obtained 40 patents while the SKB Poligrafmash obtained only 18. Thus, in order to evaluate the activity of the organization, it is important to know the dynamics of the change in a number of indicators. Therefore it is extremely necessary to

develop a system of quantitative and qualitative indicators which would contribute to obtaining more complete information about the scientific and technical activity of the organization.

In recent years in the branches and individual organizations of machine building there has been an active search for ways of improving the planning and evaluation of the activity of collectives of developers of new technical equipment and individual performers of the work. It is typical of the majority of organizations that the research that has been conducted pertains to the development of principles of commensurability and the introduction of these into the work of scientific research institutes and design bureaus. And since their application must be based on a complete and objective evaluation of the capabilities and the results of the activity of the collectives of developers, major attention has been devoted to the formation and concretization of the system of indicators. The indicators that are now being applied do not coincide with one another either in terms of selection or in terms of the methods of determining them. Thus, for example, in the Dzerzhinsk branch of the NIIKhIMMASh (Gorky Oblast) the indicators are determined by the relative amounts (coefficients) that characterize the scientific and technical level of completed research and developments, the fulfillment of planned assignments and the economic effectiveness of the introduction of research and development. The SKB Poligrafmash uses absolute amounts for evaluation indicators: the number of workers at the end of the year, the number of subjects and expenditures on NIOKR (in terms of estimated value). The indicators that all scientific research institutes and design bureaus have in common are those that characterize the fulfillment of the subject plan in terms of the list of jobs and their volume. But the subject plan can be fulfilled with varying degrees of creative contribution on the part of the developers, that is, the number of developments will be different and therefore the objective evaluation of the activity of the collective will be more difficult. Frequently when striving for quality the scientific research institutes and design bureaus try to reduce the number of mistakes in technical specifications. This, of course, is important, but it is not the main thing since it is necessary in all ways to make sure that the ideas on which the designs are based are more progressive. And the scientific and technical level of applied development can be characterized not only in terms of the degree to which they correspond to the level of world models (which is mandatory according to the existing system for evaluating branch scientific research institutes and design bureaus), but also in terms of the number of orders that have been submitted for inventions, positive solutions to the problems that have been submitted, the number of patents that have been obtained and sold, and the number of inventions that have been utilized in research and development.

In order to improve the results of the labor of researchers and developers of new technical equipment one should base the system of evaluation of their activity on a specific subject. Having evaluated it it would be possible to determine the contribution of each performer of work to the achievement of the final results. And the activity of the entire organization can be represented as the total result of the fulfillment of all the thematic projects of the plan. The results of the work on a particular subject is evaluated on the basis of planning and evaluation indicators. The former include the overall volume of work and the fulfillment of the main list of jobs under the subject. The calculation of these indicators can be based on a comparison of the planned and

actual volume of work and the planned and actual time periods for the fulfillment of the various stages of the project. Then there can be no adjustment of the initial planned time period. In the event that the indicators are not fulfilled the thematic project is not evaluated subsequently.

Evaluating indicators include the scientific and technical of the developments, the priority, the level of standardization of machines, the economic effectiveness of developments, the reduction of the cost of the commercial product of the branch as a result of the utilization of the development (calculated), and losses from prolonging the process of "research-development."

The indicator of the scientific and technical level of the developments is considered separately for scientific research work and experimental design developments. In order to evaluate the scientific and technical level of experimental design developments one compares the given or actual technical characteristics that are most important with the best world achievements (for series produced products), but for each parameter one uses as a basis of comparison the best world model of the item and the normative level (standard). The final evaluation is reflected in percentages of the standard. In order to determine the level of scientific research work one uses scales of points for evaluation which are obtained by the expert method.

The indicator of the priority of the developments is characterized by various kinds of protection of the development: a license that has been sold, a patent that has been obtained, "know-how" that has been acquired, a positive decision regarding issuing an author's certificate or simply an application for one. The utilization of the scale of points of evaluation which characterizes the importance of each of the aforementioned kinds of legal protection of an innovation will make it possible to determine qualitatively the level of importance of the innovation both of the development as a whole and of the proposed scientific and technical solutions.

The indicator of the level of standardization of machines is determined as the ratio between the planned and obtained coefficient of standardization of machines. A reduction of the production cost of the commercial output of the branch as a result of the utilization of the development is determined on the basis of the production cost of the former and the new model of technical equipment and the proposed annual output.

Losses from prolonging the process of "research-development" are determined in terms of two constituents--losses from intervals without work and losses from extending the time periods for completing the work. Losses resulting from intervals without work are calculated by determining these intervals for each thematic project (number of months) and expenditures at the beginning of the period without work for the corresponding projects. The calculated amount of immobilized funds is determined as the product of these amounts. And losses from the immobilization of funds are determined as the product of the calculated amount of these funds and the normative coefficient of the effectiveness reduced to the monthly scale (0.15:12). In order to calculate losses from prolonging the time periods for the completion of the various stages of the work, it is necessary to know the value of the project at the moment of the change of the

time period (expenditures) and the number of months by which the time period for the completion of this stage has been extended. The calculated amount of immobilized funds is determined as the product of these amounts and losses--as the sum of the adjusted result and the normative coefficient of effectiveness, reduced to the monthly amount (0.15:12), and additional expenditures for the given stage of the project that are brought about by the prolongation of the time periods for its fulfillment (mainly under the item "wages"). This approach to calculating losses from extending time periods for the completion of the various stages of the work will make it possible to solve concretely the problem of the amount of fines for extending the deadline and, consequently, the later introduction of the development.

In order to facilitate the evaluation of a specific thematic project, we have developed a chart for accounting for the project, including all the necessary information. The evaluation of the activity of subdivisions and organizations as a whole is based on evaluation of a specific thematic project. But it is obvious that the evaluation of the activity of the collective of developers requires additional indicators that characterize the organization of the work and the importance of the results achieved by the collective of developers for the development of the branch. Indicators of the evaluation of the activity are divided into four sections: fulfillment of planned assignments, economic evaluation of the activity, qualitative evaluation of the activity and the significance of the activity of the organization for the development of the branch. The first section includes the indicators "fulfillment of the thematic plan in terms of volume of work" and "fulfillment of the main list of projects." The calculation of these indicators is analogous to the calculation of the corresponding indicators for each thematic project. The second section includes the indicator "reduction of the production cost of the commercial output of the branch" which is determined as the total amount of analogous indicators for each thematic project, taking into account the indicator of the subdivision's proportional contribution to this thematic project, and the indicator "economic effectiveness of the work," whose calculation is based on the corresponding indicators for each thematic project. The third section includes the indicators of the scientific and technical level of the work and their priority, the indicator of the level of output of scientific and technical information, and the average coefficient of standardization which are determined as averaged values for all thematic projects. This section also includes the indicator of the level of organization of the work, which requires special clarification. This indicator is integral and consists of the following components: the regularity of the work, the proportion of losses resulting from prolonging the process of "research-development," the completion of the thematic material, the quality of the fulfillment of the assignment by the developers, and the utilization of personnel. The relative importance of the constituent elements for obtaining the integral indicator is determined by the method of expert questioning. The integral indicator itself is intended to give a comprehensive evaluation of the activity of the institution from the standpoint of the organization of the utilization of its own internal resources. Indicators of the fourth section characterize the proportion of products produced from the developments of a given organization in the branch and the national economic importance of the thematic project based on the justification for including the project in the plan as well as losses from prolonging the cycle of "research-production."

Indicators of the evaluation of the activity of individual developers during a particular period of time are also based on a specific thematic project. In this section of the methods the indicators characterizing the fulfillment of planned assignments are interpreted as the indicator of the fulfillment of the individual plan (in terms of volume of work) and the employment of the developer on the thematic product (in terms of labor-intensiveness). The activity is evaluated economically through the indicator of the proportional effectiveness of the labor of the worker, which takes into account the economic effect of the development and the contribution of the developer, taking into account his proportion of the labor-intensiveness of the work on the thematic project. The activity is evaluated qualitatively in terms of five points which characterize the inventive and productive activity of the worker, the regularity of his work (the manager makes the evaluation), the quality of the fulfillment of the assignments by the developer (according to the system of SBT) and the indicator of the utilization of working time.

Thus the thematic project as the primary object of evaluation is the connecting link between the evaluation of the collectives of developers and the evaluation of individual workers, which provides for a unified methodological approach to the evaluation of the activity of the subdivisions and the peformers of the work. Such an approach makes it possible to give a qualitative and quantitative evaluation of the results of the activity of the developers of new technical equipment and makes it possible to analyze the main shortcomings of the work of the organization.

On the whole, the system of evaluation should characterize:

a) The results of scientific research and experimental design work;

b) The organization of the work in the institution;

c) The significance of the activity of the organization for the development of the branch;

d) The contribution of an individual worker to this development.

Such a system will make it possible to evaluate the activity of developers of new technical equipment at all levels of administration of the scientific research institutes and design bureaus. Moreover, such an evaluation will be unified (all-embracing). A test of the methods proposed by the authors for a unified (all-embracing) evaluation of the activity of developers of new technical equipment at the SKB Poligrafmash confirmed its practical direction. The application of the main methodological point contributed to increasing the objectivity of the evaluation and, consequently, to increasing the motivation of the developers to achieve good results of their labor as well as to the arrangement of systematic work for gathering, accounting for and analyzing statistical data concerning technical and economic indicators of the activity of the organization. This in conjunction with other measures made it possible in 1981 to reduce the length of time required for developing machines by two months as compared to 1980.

For an objective evaluation of the activity assigned to the research institutes and design bureaus and increased efficiency of their work it is necessary in all ways to develop material and moral incentives of researchers and developers of new technical equipment. Their labor is primarily collective. When solving the problem of improving moral incentives it is necessary to take into account both collective and individual results of labor. A calculation of the direct contribution of each worker to the solution of a specific scientific and technical problem should lie at the basis of the improvement of the system of wages, for increased effectivness of scientific research and development and the creative activity of scientific and technical personnel depend on this. The specific peculiarities of the labor of developers of new technical equipment also give rise to the special organization of their labor. According to data from a number of special design bureaus, the proportion of salaries amounts to 70-85 percent, which confirms the important role of salaries in the system of material incentives for workers. But they are to some degree a constant and guaranteed amount. It is generally known that the physics and chemistry institute of the Ukrainian SSR Academy of Sciences has had positive experience in certifying workers. The salary of the scientific worker depends not only on his position, scholarly degree and work tenure, but also on the effectiveness of his labor, and this is the main distinguishing feature of this system. But in practice most frequently the qualitative results of the work of the collective and of the individual performer of work are taken into account through the bonus system. Analysis of the practice of providing material incentives in a number of scientific research institutes and design bureaus of Odessa showed that in the majority of these organizations the proportion of bonuses in the average earnings is the same for all job categories.

A typical feature of the new system of planning, financing and economic stimulation of work for creating, assimilating and introducing new technical equipment is the fact that the system is based on planning a specific comprehensive thematic project. And this, in turn, raises a number of problems for the system of administration of scientific research institutes and design bureaus. Above all it is obvious that it is necessary to control the subject matter. This does not mean excluding the performers of the work from the formation of the list of orders, but presupposes a complete selection of possible research projects and developments, and the selection of the optimal variant. But closely related to this task is another one -- the development of the policy for halting work on less effectiven subject projects. It is necessary to weed out these subject projects. This will contribute to increasing the responsibility for the selection of the subject and improving the quality of the developments as well as the results of the work of the developers. Here it is necessary to develop a system of criteria which can be used to determine the thematic projects which should be covered. The task of reducing ineffectiveness developments involves the question of conducting competitive developments. Unfortunately at the present time machine building does not have parallel developments of thematic projects by several groups of researchers. We are not speaking about random duplication which leads only to a dispersion of funds that are allotted for scientific and technical preparation of production, but deliberate, previously prepared development of thematic projects by several groups of researchers simultaneously. The complexity, innovation and high cost of modern technical equipment and items lead to increased importance of the

quality of the designs. The organization of parallel development of thematic projects will contribute to increasing the objectivity of the evaluation of the developments, will make it possible to select the best and most effective variant, and at the same time will contribute to gradual accumulation of a scientific and technical stockpile in the organization, since certain of the solutions that are not used can be used in other developments. A comparative expert analysis of the developments can be carried out in the form of a competition. The competition commission should include not only specialists of this organization, but also representatives of the client, the ministry and the all-union production association. The effect of the best variant should pay for additional expenditures of this kind, which is confirmed by many years of practice of a number of foreign firms.* With this statement of the problem it is necessary to determine the fund from which the stages of the "research-production" cycle will be financed in terms of parallel development, including the bonus fund and the conditions for awarding bonuses for the best variant. These problems, in our opinion, can be solved with a unified fund for the development of science and technology (YeFRNT) in the branch. Additionally, the sum of deductions and the list of parties whose work will be judged in parallel should be considered and approved by the ministry or the all-union production association. The bonus should be awarded for the best variant immediately after calculating the economic effect, which should be done no later than two months after the completion of the work or individual stages of it (when the work is considered in stages). This should be a one-time bonus, but its amount should depend on the qualitative indicators of the development and the practical effect obtained by the national economy. The implementation of this proposal would increase the role of qualitative evaluation of work and would contribute to increasing the results of the labor of researchers and developers.

---

*See: Bobryshev, D. N. and Rusinov, F. M., "Upravleniye naucho-tekhnicheskimi razrabotkami v machinostroyenii" /Control of Scientific and Technical Developments in Machine Building/, Moscow, "Mashinostroyeniye", 1976, p 110.

11772
CSO: 1814/14

RESULTS OF COMPREHENSIVE PROGRAMS SUMMARIZED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Aug 82 p 2

[Article by D. Zhimerin, first deputy chairman of the USSR State Committee on Science and Technology, corresponding member of the USSR Academy of Sciences: "On the Basis of Comprehensive Programs"]

[Text] The policy of intensifying public production and increasing its effectiveness, which was set out by the 26th congress of our party, has required a qualitatively new approach to the resolution of tasks related to scientific and technical progress. As is well known, the most important of these tasks have become the object of 170 comprehensive programs which were developed by the USSR State Committee on Science and Technology, by the Union-level Gosplan, and the USSR Academy of Sciences in close cooperation with ministries and departments, with scientific and production collectives. According to these programs the use of new scientific-technical and design developments is supposed to free more than 3 million workers and replace manual labor with machines for 500,00 others in the current five year plan alone; it is also supposed to save approximately 14 billion kilowatt hours of electrical energy, 50 million tons of comparison fuel, as well as more than 4 million tons of ferrous and non-ferrous metals.

A year and a half of the five year plan has passed, and this makes it possible not only to sum up certain results, but also to judge the effectiveness with which the mechanism of the goal-oriented program approach, which is comparatively new in terms of common practice, operates. In this period our industry has begun production of more than 400 new and progressive forms of output. Electronic equipment has been the basis for the introduction within the year of 311 automated systems for the management of production processes.

In accordance with the targets of the programs, a great deal of work is being carried out in the area of the nation's fuel and energy complex. In particular, the structure of energy capacities has been improved, especially by bringing atomic energy into the total balance. In the first year of the five-year plan alone the capacity and production of electrical energy at atomic energy stations increased by 17.5 percent. Work has been particularly successful at the construction of the Ignalina AES [Atomic Energy

Plant[7], where 1.5 million kilowatt reactors, the most powerful in the world, will be installed. And subsequent work on the reduction of per unit fuel expenditures has made it possible for our thermal power plants to achieve the best indicator in worldwide power engineering: in the past year they expended 327 grams of comparison fuel per kilowatt hour of energy produced. In sum, the savings amounted to about 1 million tons of comparison fuel.

In the petroleum production industry the goal has been to increase output, and toward this end various measures to artifically act upon the stratum have been carried out at 16 out of 53 production associations of the industry. As a result, several million tons of extra petroleum were obtained in the past year. By the end of the five-year plan this increase should be extended significantly. The realization of this project will depend largely on the petroleum workers themselves, as well as on the USSR Ministry of the Petroleum Refining and Petrochemical Industry, the Ministry of the Chemical Industry and the Ministry of Chemical and Petroleum Machine Building. The lack of chemical supplies and the appropriate equipment is for the present holding back the process of intensifying the extraction of petroleum and reducing expenditures for this purpose. As for the valuable casing head gas, use of this commodity reached 72.4 percent in the past year.

A large set of measures has been realized in the gas industry. For example, a progressive method which makes possible a 15-20 percent increase in the production of a valuable raw material, gas condensate, was first developed at the Novtroitskoye deposits. Nearly half of the gas which is obtained by the industry's enterprises, undergoes preparation at automated installations before it is shipped out. And in the transportation of the gas ever broader use is being made of computer equipment and automated control systems, which have already been introduced at 44 percent of the large-diameter gas pipelines.

Further improvement in the gas industry's production effectiveness depends largely on enterprises of the Ministry of Chemical and Petroleum Machine Building, the Ministry of the Electrical Equipment Industry, and the Ministry of Power Machine Building. The initiative of the advanced collectives in these industries, which have set themselves the goal of putting into operation gas pumping units of 16,000 to 25,000 kilowatts, powerful compressors and electric motors, is worthy of all possible support. The use of this kind of equipment promises to reduce the per unit capital investment by 17 percent and to cut in half (approximately) the time required for construction of compressor stations.

In the coal industry the proportion of output obtained by the most mechanized open method reached 39.2 percent in the past year. In accordance with the targets of the comprehensive programs, a powerful rotary excavtor with productivity of 2,500 cubic meters per hour was introduced into the operations at the Bogatyr coal face in Ekibastuz. Using equipment of this kind, the process is continuous; this continuity ensures productivity which is more than double that of single-scoop excavators. In underground work the proportion of output obtained with the aid of comprehensively mechanized means which increase productivity by 1.5-2-fold, has reached 68.8 percent.

Successful testing of the KM-130 mechanized unit for strata with a steep dip was carried out at the Yasinovskaya Glubokaya Mine in the Donbass. In addition to the 1.5-2-fold growth in productivity, it also improves the safety of the miners' labor.

In the metallurgical industry, various projects to improve the qualitative indicators for the metal have become one of the main trends. For this purpose a plasma-arc furnace to obtain 12-ton ingots was established and put into experimental operation; at the Elektrostal' Plant an electron beam furnace, which makes it possible to obtain steels and alloys of high purity and homogeneity, was installed.

In the past year the Novolipetsk Plant has started to use a new technology for smelting steel with subsequent continuous casting, which increases the output of acceptable metal by more than seven percent. The Cherepovetsk Metallurgical Plant has put into operation the world's larged oxygen converters with a capacity of up to 400 tons, along with movable mixers having a capacity of 600 tons. And at the Vyksunsk Plant, construction has been completed on a unit for the production of multilayered conduits for gas pipelines at a pressure of 100-200 atmospheres. In accordance with the targets of the comprehensive program, a plan was developed and construction started on a unique blast furnace at the Cherepovetsk Plant; the capacity of this furnace is 5,500 cubic meters.

The Novolipetsk Plant has introduced a system for managing a sheet mill; this system, which is based on electronic equipment, makes it possible to judge the effect of automation in this industry. It has increased the mill's productivity by 15-20 percent, and the output of sheet metal has increased 2-3 percent as a result of control which is more accurate than manual control.

In the chemical and petrochemical industries the targets of the comprehensive programs have been aimed primarily at expanding the production of new items and at increasing their quality through the introduction of progressive equipment and technology. In particular, the task of achieving more thorough refining of petroleum was set; toward this end the Volgogradneftemash Product tion Association manufactured a set of equipment with a capacity of up to 5 million tons per year. This installation will make it possible to obtain an additional 2 million tons of annealing products, to reduce per unit capital expenditures by one-third and to reduce operating expenditures by 20 percent. At the same time construction sites will be reduced to one-third of the present area, energy expenditures will be reduced to one half the current level, and metal expenditures will be reduced by 35 percent. And labor productivity will double.

In machine building the past year and a half of the five-year plan has been marked by attention to the designing of new machines, equipment and instruments which will provide for the mechanization and automation of labor-intensive processes, a substantial reduction in the proportion of operations performed manually as well as substantial increases in labor productivity. For example, in the last year 20 sets of equipment were introduced for the mechanization of labor intensive warehouse and

loading-unloading work; 279 mechanized warehouses have been established; 4,435 machines with ChPU /expansion unknown/ have been received by enterprises; this represents 102.5 percent fulfillment of the plan for these machines. A large step has been taken in the area of industrial robots and manipulators; in the last year, their output has grown 1.7-fold to reach 3,230 units. At the same time ten new and better models have been developed and put into production.

The machine builders have also accomplished a great deal in the introduction of progressive technologies. In particular, the plan targets of the past year for the use of instruments made of elbor, hexanite and other superhard materials have been overfulfilled. One hundred thirty-eight instead of the planned 130, installations were set up for ultrasound, electronic beam and laser processing.

About 40 of the planned comprehensive programs are related in one degree or another to a production problem. They are aimed at increasing the effectiveness of the agro-industrial complex of the country in the light of the Food Program adopted by the May (1982) plenum of the CC CPSU. They include measures to increase soil fertility as well as measures to establish effective new technical resources. More specifically, program targets stipulate the development and introduction of more than 300 types of high-productivity agricultural equipment and the development of the production of new highly-concentrated mineral fertilizers with a longer active life and a better balance of nutrients. Equipment for the mechanization of 40 operations which are currently performed manually are being established for animal-raising complexes where most of today's production of meat and dairy products is concentrated.

In summing up results, it can be said that in the recent past much has been done in the designing and introduction of new equipment and technology. At the same time it is essential to note that in the past year the targets of the comprehensive programs were only fulfilled by 96 percent. In some cases deadlines were not met only because ministries such as the union Ministry of the Coal Industry, the Ministry of Non-Ferrous Metallurgy, the Ministry of Power Machine Building, the Ministry of Agricultural Machine Building, the Ministry of the Petroleum Refining and Petrochemical Industry, as well as certain construction ministries, have not brought the program targets to those who must fulfill them in time; nor have they adopted the necessary measures to fulfill them.

For example, subdivisions of the USSR Ministry of Power and Electrification did not introduce on time three atomic reactors, and this, naturally had a negative effect on savings of solid and liquid fuel. It is sufficient to recall here that one atomic reactor with a capacity of 1 million kilowatts makes it possible to reduce annual requirements of mineral fuel by no less than 2 million tons. It can only be regretted that more than one-fourth of the natural gas which accompanies the extraction of petroleum continues to go up in flames.

The metallurgists, who--contrary to the targets of the comprehensive programs--have not yet put into production pipes with an exterior anti-corrosion

covering, remain in debt to the gas workers. As a result, coverings must be put over the top when the pipelines are being laid, and this complicates the work. There are also quite a few other "gaps" in ferrous metallurgy, particularly with regard to the mastery of new equipment and technology. For example, the Tulachermet Scientific Production Association has not introduced a progressive method for injecting reduction gas fuel into a blast furnace. Incidentally, the transfer of only six blast furnaces with a volume of 2,000 cubic meters to this technology could yield an increase in the annual smelting of pig iron of 2.1 million tons; it can save more than 300,000 tons of coke and about 700 million cubic meters of natural gas.

A faster rate of technical progress is also to be desired in the coal industry. In the past year the USSR Ministry of the Coal Industry did not fulfill the plan for mining by cutting combines, for the extraction of coal by mechanized complexes. The plan for the introduction of new equipment and technology was only 72 percent fulfilled in terms of volume of work. Nor did the USSR Ministry of the Chemical Industry or the Ministry of Petroleum Refining and Petrochemical Industry meet their targets for new equipment either. And a number of machine building ministries did not fulfil the plan for the replacement of obsolete items with new ones or for the modernization of machinery. The machine builders have been slow at reducing the proportion of manual labor in their industry.

All these inadequacies require the most persistent attention and a critical analysis of the reasons for them in every ministry, agency, institute design office and enterprise. Substantial assistance at the local level should be given by the party organizations of the union republics, the krays and oblasts, where the scientific-design organizations and enterprises specified in the programs are based. The task is to ensure that an understanding of personal responsibility is shared by all the scientists, planners, specialists and designers who are participating in the programs. In the final accounting the successful fulfillment of the most important tasks set by the 26th congress of our party depends on their talent, knowledge and persistence.

8543
CSO: 1814/26

NONDESTRUCTIVE QUALITY CONTROL DISCUSSED

Moscow PRAVDA in Russian 22 Aug 82 p 3

/Article by M. Mikheyev, chairman of the organizing committee of the 10th International Conference on Nondestructive Quality Control, corresponding member of the USSR Academy of Sciences: "Secrets of Reliability: the 10th International Conference on Nondestructive Quality Control Opens Tomorrow"/

/Text/ International conferences on nondestructive quality control have been held every three years for nearly 30 years in various countries of the world. The next one will be held in Moscow. Scientists and specialists from many countries will take part in it.

What has prompted such widespread interest in this problem? In our age of equipment which operates at high speeds, high pressures and with extremely heavy loads, the traditional methods for controlling the quality of materials and manufactured items long ago proved to be inadequate for ensuring the reliable and long-term operation of machines and parts. And, in fact, carrying out mechanical tests, as well as metallographic and chemical analysis, requires cutting off a sample piece of the items. Of course, this damages them and, consequently, it can be used only for quality control by sampling. And it cannot guarantee that all of the output is of high quality. Moreover, a number of defects, those which arise from fatigue, for example, must be discovered not only during the manufacturing process of any given parts, but also while they are in use. Here nondestructive control methods are absolutely essential.

They can be described in other words as physical methods because they were created on the basis of phenomena and laws of physical processes, which develop in the material used to make the items being subject to inspection. Irradiation with X-rays and gamma rays, ultrasound, electrical, optic, magnetic, thermal, capillary and other methods are particularly deserving of attention.

The use of nondestructive methods of quality control is especially effective on all types of transportion: railway, air and underground forms of transportation, etc. In the USSR successful use is being made of magnetic and ultrasound railway car defectoscopes, which move at a speed of up to

70 kilometers per hour. They make it possible to check the quality of the rails of all the railroads in the country several times a year.

The appearance of these railway cars is the result of cooperation between the employees of the Ministry of Railways, a large group of defectoscope specialists at the Scientific Research Institute of Bridges of the Leningrad Institute of Railway Engineers and the Volna Production Association. A significant contribution to the design and introduction of high-speed railway car defectoscopes was also made by scientists at the Institute of the Physics of Metals at the Ural Scientific Center of the USSR Academy of Sciences.

The most important units and parts of all airplanes are also checked periodically by means of various nondestructive methods. For examples, ultrasonic emission sensors send the flier a signal concerning the appearance of a fatigue defect large enough to be dangerous and concerning the need to make an emergency landing. Magnetic defectoscopes are also operating successfully for making observations on the state of steel pipe sections of existing underground mainline oil and gas pipelines.

Recently the issue of a reliable check of the quality of welded joints has become acute. The task is to convert it from a means of sorting finished products into an instrument for actively influencing the production process, for creating instruments and installations which can be incorporated into production lines. At present a number of the nation's plants (the Severskiy and others) have at their electric arc welding lathes for pipeline sections magnetic defectoscopes which operate successfully for automated quality control of the welded seam of steel pipes.

In addition to defects, which were discussed above, structural flaws, which reduce mechanical properties to an unacceptably low level are also found no less frequently in steel and cast iron products. For example, highly carbonaceous chromium steel becomes so brittle during the hardening process that collars made from it can disintegrate from the smallest blow. In this case the flaw cannot be discovered by the traditional methods of measuring hardness: the steel is just as hard as normally hardened parts. Other kinds of methods are necessary. And they have been found: various kinds of magnetic structuroscopes, coercive force meters, and other instruments have been devised in our country. With them nondestructive quality control can be carried out on thermal processing, the mechanical properties of rolled steel products, the hardening of rollers for cold rolling, the teeth of large gears and many other products.

There is another problem which involves checking the thin coatings such as the protective, anti-corrosion coverings which are put on steel products. Without this it is impossible to produce even a simple can. Here the nondestructive thickness gages--magentic, radiation and ultrasonic--came to the rescue. They are being used successfully to measure the thickness not only of the protective coverings, but also the thickness of the rolled products during the production process.

Until recently marine vessels were taken into dry dock and a multitude of through openings were checked during a routine examination to determine the degree of corrosion on the steel covering of the ship's hull. Now the necessary information can be obtained by means of an ultrasonic thickness gage while the ship is in the water.

Major collectives which carry out fundamental scientific investigations in the area of nondestructive physical methods of control and implement them are operating successfully in our country within the system of the USSR Academy of Sciences and the academies of science of the union republics (the Institute of Applied Physics of the Belorussian SSR Academy of Sciences, the Institute of Electric Arc Welding imeni Y.E. Paton of the Ukrainian SSR Academy of Sciences, the Institute of Polymer Mechanics of the Latvian SSR Academy of Sciences). Much work in this same area is being carried out in the physical and technical departments of nondestructive control at a number of higher educational institutions of Moscow, Leningrad, Riga, Tomsk, Novosibirsk, Sverdlovsk and Izhevsk.

Major scientific-production associations with a fairly good experimental base have appeared within the Ministry of Instrument Making, Automation Equipment and Control Systems. They include such leading sicentific institutions as the Institute of Intrascopics (NIIIN) in Moscow and the All-Union Institute of Nondestructive Control (VNIINK) in Kishinev. The associations are called upon to supply other industrial institutes and laboratories at the nation's plants with the appropriate equipment.

I would add to what has been said above that sections entitled Instruments of Nondestructive Control and Quality Control of Welding are operating under the auspices of the USSR State Committee on Science and Technology. A significant influence on the progress of these investigations is exerted by the Scientific Council of the USSR Academy of Sciences on the Problem of Physical, Nondestructive Methods of Control, which has been assigned to coordinate and provide scientific and methodological leadership for all of the work in this area, which is carried out by the ministries and agencies of the country. For more than 15 years Soviet defectoscope specialists have had their own monthly journal, which is put out by the USSR Academy of Sciences.

All of this provides evidence of the level of development and application of nondestructive methods of quality control in the Soviet Union. And there is further evidence of this in the decision to hold the next international conference in our country. Worldwide experience and current achievements in this area will be broadly represented at the conference in the reports of scientists from the socialist countries and from a number of capitalist nations (England, the FRG, USA, France and Japan). An exhibition of instruments, equipment and means of nondestructive control entitled "Intrascopics-82" has been timed to coincide with the conference.

The Soviet defectoscope specialists who are participating in the conference will undoubtedly make fruitful use of the achievements of scientific and technical progress in the struggle to improve the quality of materials and of all types of manufactured products.

8543
CSO: 1814/26

USES OF INFORMATION DISCUSSED

Minsk SOVETSKAYA BELORUSSIYA in Russian 5 Oct 82 p 2

/Article by A. Zhuravlev, Sector Chief at the BelNIITI, BSSR Gosplan, Candidate of Technical Sciences: "Information is Looking to be Applied: A Scientist Poses a Problem"/

/Text/ Much has been said and written about the effectiveness of scientific and technical information. And if specialists again and again raise this question, the reason is the complexity and multifaceted nature of the problem. The point is that the rapid growth in the volume of information has resulted in major changes in the nature of human labor. Thus while society's production during the period of the industrial revolution was characterized by the quantity of the materials, funds, energy and labor consumed, scientific and technical information introduces the extra factor of information-intensiveness. The term "the information explosion" has gained currency, being meant as a vigorous growth in the volume of the information produced and consumed in the process of labor. Thus, the doubling of the volume of information circulating within society compared with the beginning of this century took about 50 years, whereas now such doubling occurs at the rate of once every 10 years. The outlays on utilizing information as a production resource have increased correspondingly. For example, at some enterprises which had 8-10 years ago introduced their first ASU /Automated Control System/ sections a new expenditure item on the scale of 100,000 to 150,000 rubles annually had to be introduced.

But information is a special resource. It displays the remarkable property of economizing, when properly handled, all the other production resources--labor, materials and energy. This is demonstrated by the data on the effectiveness of the utilization of scientific and technical information (STI) in our republic. The savings yielded by the application of new scientific and technical developments gleaned from STI sources in 1971 totaled, for the BSSR as a whole, 44.6 million rubles in 1971, whereas already in 1981 they climbed to 101.9 million rubles. The growth rate has been above 10 percent. Every ruble spent on the collection and dissemination of STI yields an income of 10-15 and more rubles in the BSSR. The absolute figures may be contested, since the procedure for determining them is still far from perfect, but the vigorous growth rate speaks for itself.

Or another example: Calculations show that the development of a servosystem for the monitoring and analysis of the in-transport losses of just some building materials would save the republic 450,000 cu m of glass, 6.6 million of nominal slate tiles and 25,000 cu m of precast reinforced concrete. The annual savings from the use of such

information would total 2.6 million rubles. Every ruble spent on this purpose would yield more than 40 rubles in income. What better proof of the resource-saving quality of information?

Yet another special feature of STI is that its absence bars the access to new sources of raw materials and energy and renders technological improvements impossible. There even exists an approximate formula showing that society's energy wealth and hence also economic might increases roughly in direct proportion to the square root of the increase in the volume of information.

It would seem that the problem reduces to learning how to utilize information resources rationally so that, once this is done, the obstacles on the path toward the further development of production due to the limitations on raw materials, fuel, energy and manpower would be surmounted. But this simplicity is only apparent, because the real isssue is that of a revolution in the nature of labor, in the full meaning of that expression. For until now people used to learn how to work chiefly with their hands. Now, however, a genuine resolution of economic problems requires an active utilization of information, i.e. the transition to a level of productive forces which will differ from the current level by being based on a much greater proportion of mental work.

But to this end it is necessary to intensify the performance of the mind, which is far from simple, being often obstructed by long-established habits and customs, traditional approaches and the occasioal absence of the necessary conditions for working in a new way.

As known, for example, so much effort has been expended to spread the acceptance of methods of systems analysis when substantiating management decisions. So what happened? Did many managers and administrators master this approach by now? The resistance to the innovation has proved so strong that the only university department teaching economic cybernetics in the republic has even been abolished. How then can the new methods of planning and management be introduced when there is no training available for experts in modern scientific apparatus of the analysis of socio-economic processes who could develop that apparatus as the needs of management practice arise? Since information is disseminated and introduced solely through its direct impact on human consciousness, the matter can be resolved successfully only if, as a minimum, the creators, the disseminators and the users of information should all be appropriately trained and share a common interest in the end-result of this all-encompassing process and even, to put it another way, be dependent on it.

One more example: at the BGINKh /Belorussian State Institute of National Economy/ imeni V. V. Kuybyshev each year several hundred production managers at various levels undergo advanced training in their specialties. In my 6 years of teaching I had the opportunity to get to know many of them. In dozens of classes I asked the same question: "Why are you here?" And always I received the same answer: "We were assigned here." But what if they had not been assigned? It would seem that then the advanced training courses would have to be discontinued owing to the absence of students. As for selecting applicants on a competitive basis, no one had even thought of it. Thus, it turns out, the students themselves are not always interested in either learning how to utilize information or receiving it.

In our opinion, it is precisely the weakness of the socially useful orientation of consciousness that is a major reason why not too much active interest is shown in assimilating the information on new developments provided by the STI service. This results in an insufficiently high rate of increase in the economic effectiveness of various subsectors and types of production. After all, more than 80 percent of the information on new development is applied only at one or two enterprises and only about two percent is applied at five or more enterprises, although many of these developments merit the attention of tens and hundreds of industrial, construction, transport and agricultural organizations.

And how many innovations are either not introduced at all or introduced at a disgracefully slow pace?.... There is no one in particular to put the blame on, since the buck is passed around. For example, the aerosol method for disinfecting and deodorizing animal-husbandry premises with forest balsam had been recommended and introduced as an invention as far back as in January 1980. Calculations showed that the universal introduction of that method throughout the BSSR would save more than 15 million rubles annually. This year that progressive method will be used to treat only a little more than two percent of all animal-husbandry premises. No major changes in this respect are to be expected for the next few years.

Or consider the fate of the proposal for mounting special air baffles in front of the windshields of trucks--a proposal made 4 years ago and, incidentally, successfully applied abroad. This ingenious attachment saves more than 10 percent of fuel by improving the aerodynamic quality of vehicles. But it is only, now, despite the most active public promotion of this innovation, that such baffles are about to be experimentally introduced at the NPO "Avtotranstekhnika" [Motor Transport Technology Scientific Production Association] of the BSSR Ministry of Motor Transport.

The above examples which pertain to elementary innovations that require no superhuman effort for their introduction, show the extent of the loss due to mental laziness, passivity and disingenuity, to the reluctance or inability to receive and utilize information. They also demonstrate that apparently propaganda and agitation alone are not enough to promote the introduction of innovations. Obstacles to this process have to be identified and removed.

One of the strongest obstacles to an effective utilization of STI is, in my opinion, due to defects in the machinery of management, which leaves the dissemination and introduction of innovations up to the enthusiasm of individuals, in the main, instead of operating "levers" for the direct utilization of this extremely important means of influencing the quality of work.

For example, the salaries of the personnel of the republic STI system are almost in no way tied to the practical introduction of their recommendations, just as the salaries of the personnel of the republic planning agencies are not tied to the end-results of production. This violages the principle of feedback in management and hobbles the functioning of the machinery of management.

To eliminate these shortcomings it is necessary, I believe, to make the salaries of all persons linked by the "idea-design and development-logistics (including the provision of information)-production" chain directly contingent on the end-results. It

is primarily necessary to develop and introduce appropriate criteria for evaluating the performance of the personnel of the apparatus of management and administration whose activities are related to information and to interest such individuals in optimizing the adopted decisions and the recommendations made. Incidentally, the proportion of such personnel will steadily rise and any artificial curtailment of its increase would only create new difficulties. Hence a provision should be made for conducting appropriate studies at a scientific collective (perhaps at a re-established university department of economic cybernetics).

However, such studies, which should be in the nature of basic research, would bear fruit only after 5-7 years in the best case. This means that their commencement should not be postponed. Hence, along with the organization of basic research, the experience already available in this country should be utilized.

Special attention is merited by the activities of the SVO /specialized introduction organizations/ set up several years ago in Moscow, Novosibirsk, Baku, Tallinn and Lvov. Their purpose is to master various innovations and subsequently introduce them at many facilities. As shown by the operating experience of the SVO, they save time and money on the introduction of innovations and sharply increase their economic effects. For example, the operations of the Baku "Novator" SVO make possible a 1.2-1.5 percent annual increase in the labor productivity of industry in the Azerbaijan SSR. The services of that firm also are being used by enterprises of Moscow, Leningrad, Kiev and many other cities. Although there are so far only a few SVO and their status has not been officially legitimized, they have incontestably demonstrated the effectiveness of this new form of bond between science and production.

It would be a good idea to set up a SVO under the BelNIITI of the BSSR Gosplan. Perhaps the rights and obligations of an already existing firm, the BelTSENTRNOTinform /Belorussian Central Organization for a Scientific Organization of Labor and for Information Services/ should to this end be broadened and its functions defined more precisely.

1386
CSO: 1814/22

STREAMLING FLOW OF SCIENTIFIC AND TECHNICAL INFORMATION

Ashkhabad TURKMENSKAYA ISKRA in Russian 20 Oct 82 p 4

/Article by T. Borovikova, Senior Scientific Associate, TurkmenNITI /Turkmen Scientific Research Technological Institute/ of the TuSSR Gosplan: "Information for Science and Industry"/

/Text/ The rapid development of science and technology has resulted in a flood of scientific and technical information. It is difficult for scientists, engineers and technicians to orient themselves in this boundless ocean. It was calculated that they waste form 30 to 50 percent of their work hours on locating needed information.

Considerable assistance in gathering, processing, classifying, storing and disseminating information is provided to specialists by the personnel of the state scientific and technical information system. In our republic this work is directed by the associates of the TurkmenNITI of the TuSSR Gosplan--a service whose main task is to provide the republic's enterprises and organizations with needed reference information, whose stock at the TurkmenNITI exceeds 1.5 million units and each year increases by nearly 200,000.

The Institute employs the most varied methods for disseminating information about new developments in science, technology and culture. At the republic's enterprises and organizations more than 200 thematic expositions dealing with current political events, aspects of economic development and scientific and technical accomplishments in various branches of industry and agriculture are held each year: "Days of Information," "Days of Technology," "Days of Science," and so on.

Special attention is being devoted to what is called selective dissemination of information (SDI), which saves time on the search, dissemination and regular publication of information. During the first half of this year alone specialists in the republic followed the SDI system in transmitting more than 23,000 information reports, and 7,000 copies of information documents and materials that were used in R&D and design projects and papers.

Currently the development of a new thematic scope for information services based on the SDI system--the "Informkompleks-83," has been completed. It is designed to give priority to providing all needed information for the scientific and technical program which the republic's scientists and experts are working to implement. For example, such information as the utilization of solar energy in branches of the na-

tional economy, increasing the output of animal husbandry on an industrialized basis, secondary treatment of mineralized waters, etc.

Such topics will be followed by specialists at the TurkmenNITI in selecting information, compiling selective reports on domestic and foreign scientific and technological accomplishments. In this connection, this year the associates of the information service will begin to be assisted by the automated system of the TurkmenNITI which will retrieve needed material on the basis of the latest information on patents issued in 49 countries.

For the benefit of industrial enterprises the section of the "Informkompleks-83" dealing with protection against corrosion will be expanded. Thus, experts at chemical enterprises will be interested in selective information reports on the protection of technological equipment against corrosion; workers of light industry and construction will be interested in protecting structures against the harmful effects of the atmosphere and moisture; and specialists of the petroleum and gas industry will be interested in protecting piping and underground structures.

The "Informkompleks-83" devotes great attention to environmental protection. It provides information on new developments and technological projects introduced into production. Their application can markedly improve the treatment of industrial wastes prior to their expulsion into the atmosphere and reduce these wastes at such enterprises as the Mariyskaya GRES [State Regional Electric Power Station], the Krasnovodskaya TETs [Heat and Electric Power Station] and petroleum refinery, the Cheleken Commercial Carbon Plant and the Bezmein Cement Plant. Selective information reports on the organization of subsidiary farms have been included for the first time. They should help the heads of the republic's plants, factories and construction organizations learn about the leading experience in and scientific organization of those "green" shops at the country's enterprises.

It is worth noting that, as before, considerable attention is being devoted to preparing information on new developments in production for the enterprises and organizations of the ministries of agriculture, motor transport, communal economy, and consumer services in the republic, as well as for the All-Union Association "Turkmengazprom" /Turkmen Gas Industry/, the Karabogazsul'fat" [Gas and Sulfate] Production Association and many others, which maintain regular ties with the Institute and receive information enabling them to introduce broadly the latest achievements of science and technology, thus increasing labor productivity and improving quality of production.

Our assistance to scientists and specialists at the republic's enterprises and organizations is also producing actual economic results. During the first year of the 11th Five-Year Plan period alone, the application of scientific and technical accomplishments based on the information provided in our scientific and technical reports has produced economic results of about 13 million rubles.

1386
CSO: 1814/22

COOPERATION OF SCIENCE AND INDUSTRY IN MINSK PROMOTED

Moscow IZVESTIYA in Russian 13 Aug 82 p 3

/Article by V. Kevich, secretary, Minsk City Belorussian CP Committee, chairman of the city council for the introduction of achievements of scientific and technical progress into production: "A Search Strategy: Effective Forms of Integration of Science With Production Assure Successful Accomplishment of National-Economic Tasks"/

/Text/ Every stage in the advance of scientific and technical progress imposes its own tasks in the field of improvements in management. Currently the most acute problem is that of a harmonious combination of subsector and territorial principles in the management of scientific and technical progress. And the most urgent problem in this connection is to overcome interdepartmental barriers.

In Minsk, as in many other major scientific and industrial hubs of the country, the function of organizing and coordinating the management of scientific and technical progress on a city-wide scale was assumed by the local party organs.

In recent years we have succeeded in making science more cognizant of the needs of production and developing and applying new original forms of the integration of science with production. The Minskers were among the first in the country to employ such a highly promising form of interaction between scientists and workers of industry as the scientific-production association. This makes it possible to bypass interdepartmental compartmentalization and gather "under one roof" practically all the links in the cycle from research to production as well as to markedly improve the quality of products and shorten the periods of introducing innovations.

This may be exemplified by the "Avtofiztekh" Scientific-Production Association which encompasses technical and physico-mathematical institutes of the BSSR Academy of Sciences as well as the enterprises of the "BelavtoMAZ" /Belorussian Automobile Works in Minsk/.

The economic effects of the operations of the "Avtofiztekh" during its first year of existence were such as to save about 4 million rubles with respect to its main plant alone. Currently a major project on which the association is working is the development of a unified system of standardized trucks and truck-trailer trains.

Even so, we are not quite satisfied with the association's performance. So far its scope of activities is restricted to the main enterprises of the "BelavtoMAZ," that

A number of measures has been outlined to eliminate the shortcomings. The measures include the development and introduction of a system of monitoring the performance of the subsector scientific research institutes and design bureaus. Joinly with the BSSR Academy of Sciences and other concerned ministries and organizations, the city's scientific research and design institutes will be verified for the purpose of certification. Proposals to the leading administrative organs of the republic are being drafted with the object of bringing order into the structure of scientific research institutes.

Currently more than one-third of the industrial output in Minsk subject to certification is manufactured with the pentagon of honor [State quality label]. This is incontestably due chiefly to the cooperation of science with production. Of course, we are not going to rest on laurels. We view the assurance of a full integration of science with production and their organic fusion in the process of the joint solution of national-economic problems as our main task.

1386
CSO: 1814/22

R&D ACTIVITIES OF BELORUSSIAN SSR ACADEMY OF SCIENCES DESCRIBED

Minsk SOVETSKAYA BELORUSSIYA in Russian 1 Sep 82 p 2

/Interview with V. P. Gribkovskiy, Deputy Chairman of the Council for the Coordination of Research Activities under the Presidium of the BSSR Academy of Sciences, by I. Gurinovich: "Cooperation: Science at Work"/

[Text] Scientific and technical progress in this country is advancing in giant strides. A major reason for its achievements is the cooperation of the nations, the wise Leninist nationality policy. Thanks to the concern of the party and government and the broad assistance of the scientific institutions of Moscow, Leningrad, Liev and other cities, the BSSR Academy of Sciences has become a major center of scientific thought in the country.

Our correspondent I. Gurinovich turned to V. P. Gribkovskiy, deputy chairman of the Council for the Coordination of Research Activities under the Presidium of the BSSR Academy of Sciences, corresponding member of the BSSR Academy of Sciences, with the request to describe mutual cooperation between that academy and the country's other scientific centers as well as the tasks being implemented by Belorussian scientists to translate into reality the decisions of the 26th CPSU Congress.

/Answer/ Today the AN/Academy of Sciences/ BSSR consists of five divisions comprising 32 scientific research establishments, including 27 institutes.

During the first year of the 11th Five-Year Plan period alone the Academy's scientists introduced into the national economy 327 projects with economic results totaling 168 million rubles and received 907 author's certificates for inventions.

But perhaps the most convincing illustration of the maturity and high level of scientific development is the registered new discoveries of natural phenomena made by the Belorussian researchers: Academician AS BSSR Ye. G. Konovalov, an outstanding scientist in the field of machine-building technology; Academician AN BSSR A. A. Akhrem, a biologist; Academician N. A. Borisevich, a physicist; and Doctor of Sciences V. G. Baryshevskiy, a nuclear physicist.

/Question/ Science today has become a sphere integrating the efforts of hundreds of thousands of people. This process leads to the cooperation of not only many scientific centers but also science and production. Viktor Pavlovich, tell us, please, about the forms being acquired by this cooperation, how is it characterized, and to whom is it principally addressed?

[Answer] Many forms of cooperation by academic science have arisen and continue to develop. I shall dwell on one such form which seems to me of special interest, and which is intended to streamline the effectiveness of research and expedite its application to production.

During the 10th Five-Year Plan period the AS BSSR has in the main converted to the targeted-program method for the planning and coordination of scientific research.

This planning technique serves, picturesquely speaking, to gather into a closed fist the principal forces and resources for the solution of the most topical and complex problems and enhance the comprehensiveness and coordination of research.

Thus, for example, scientists at our academy were entrusted the task of heading the scientific and technical programs for the development and production of prototype models of high-precision instruments, laser devices and technologies, processes of the microbiological synthesis of nutrient proteins, anti-corrosion processes and materials, etc.

Of course, such a targeted-program approach to the solution of key problems is still further expanded through cooperation with the academies of the other Union republics. Thus we have been successfully cooperating already for many years with the academies of sciences of the Ukraine and Moldavia. In 1981 the implementation of seven regional programs was commenced. Joint R&D work is under way on the principles of rational utilization and conservation of waters of the basins of the Dnepr, the Pripyat' and the Dnestr, along with joint studies of the geologic structure and assessment of mineral deposits in the region.

The cooperation of Belorussian and Tajik scientists is developing fruitfully, with joint research being envisaged on 14 topics, along with joint application of seven projects. Collective work on the automation of scientific research is being done together with scientists from the Latvian SSR.

[Question] Viktor Pavlovich, tell us in more detail about the cooperation and socialist competition between the scientists of Belorussia and Lithuania.

[Answer] The history of these contacts is now more than three five-year periods old. Most of the institutes of the AN BSSR cooperate with the scientific establishments of the AS LiSSR. In February 1981 the performance during the 10th Five-Year Plan period was assessed and the plan for the new five-year plan period was approved. That plan provides for the conduct of joint research into 40 topics of the most varied nature: they include R&D work on computer software, treatment of liquid wastes, and geologic, seismologic, economic, historical, and linguistic problems topical to both republics.

In practice, each year we combine efforts to conduct scientific expeditions. For the current five-year period plans exist to conduct expeditions with the object of analyzing the effect of industry on natural environment in the river valleys of the LiSSR and BSSR, folkloric expeditions to regions of the Belorussian-Lithuanian borderlands, etc.

The cooperation and competition between the two academy collectives enrich both and contribute to greater effectiveness of scientific research, mutual utilization of operating experience, and deepening of the friendship between the fraternal nations. This also involves an organically intertwined and specific division of labor along

with harmony of cooperation. Thus, joint training of scientific personnel in more than 15 disciplines is being conducted. Mutual utilization of unique scientific equipment by scientists has become traditional. For example, our Lithuanian colleagues work with the atomic reactor of the AN BSSR Institute of Nuclear Energetics, while our scientists work at the seismic station of the LiSSR Institute of Physics.

/Question/ And in conclusion, could you tell us about the prospects for the development of scientific coopeation among scientists....?

/Answer/ The Latin word 'complex,' which denotes a mutually conditioned combination of different subjects and phenomena, has become the symbol of the times. These days, large scientific-production associations and territorial complexes are being established and it is becoming necessary to develop multitargeted programs for regional development designed for two or three five-year periods ahead. The outstanding example of these is the program for the complex or comprehensive development of Siberia, conditionally termed "Siberia," which is being implemented on a grandiose scale by the scientists of the Siberian "akademgorodok" /town of the academia/. That scientific project provides for the solution of the principal problems of the utilization of the mineral raw-material, forest and water resources of Siberia, along with socio-economic, ecological, philosophical, and other problems. Siberia with its "vastness" is being integrated into a single whole by the efforts, studies and recommendations of scientists of the entire country. Scientific collectives in the most varied disciplines and areas of "residence" are cooperating under the flags of such regional programs as "Baykal" and "BAM" /Baykal-Amur Railroad/.

Nineteen scientific institutions are engaged in the complex scientific-technical "Poles'ye" program being developed by Belorussian scientists.

Closely adjoining thereto is the targeted scientific-research program combining the efforts of the research and design organizations of Belorussia and the Ukraine as regards increasing the effectiveness of utilization and conservation of the natural resources of the Poles'ye region. The implementation of these programs will serve to enhance the socio-economic effectiveness and ecological reliability of the work to transform that unique land into a highly developed agroindustrial complex and translate into reality fundamental scientific research.

One believes that it is precisely work of this kind that represents highways leading us toward the future.

1386
CSO: 1814/23

INVENTIONS IN HUNGARY PROCESSED

Moscow IZVESTIYA in Russian 13 Oct 82 p 5

[Article by N. Yermolovich, special correspondent of IZVESTIYA, Budapest-Moscow: "Going to the Bank With an Invention: A Report from Hungary"]

[Text] It is a truism that inventors do not lead an easy life. And usually it is the first step that is most difficult. It is only afterward that sometimes recognition and fame arrive. It is to whom can one turn for help, on what door can one knock, that decides the fate of both the invention and its author.

In Budapest I was reminded of the story of the Rubik cube, a puzzle which has become extremely popular in many countries. It would seem to be something very trivial, yet it has yielded substantial profits to Hungary. However, this income could have been much greater still, according to the Hungarian comrades. Unfortunately, the Rubik cube had not been immediately patented. No one could even have suspected that it would cause such a stir in an instant throughout the world. So how could anyone, at the very moment of its appearance, have been bold enough to spend huge sums, and in hard currencies at that, in order to acquire patents in foreign countries for the Hungarian toy? And there was hardly anyone who could have advised Erne Rubik, a lecturer at a Budapest higher school, where to turn for support and assistance with his multicolored cube.

On my part, of course, it would be presuming to claim that had a Fund for Innovations been existing at that time at the Hungarian National Bank in Budapest, the commercial side of the success of Rubik's invention could have been completely secured. Most likely, this is what would have happened. But now the matter is purely academic.

But were that brain-teaser been invented now, E. Rubik would make a beeline for the Fund for Innovations--this is certain. Because recently this is precisely how quite a few of his fellow inventors have acted.

Thus, in Hungary one goes with an invention to the bank. Of course, not in order to deposit his brainchild in a safety vault. The very idea of thus "freezing" the fruit of one's labor and inspiration is intolerable to the true innovator. The more so as most often the inventors bring to the bank a stack of blueprints or even just a report.

This raises the logical question: why to the bank?

Erzhebet Birman, the head of the Fund for Innovations, explains: "Of course, inventors not only turn to the bank. In this country a centralized system for funding technological development has long been in operation. All industrial and many agricultural--state farms and cooperatives--enterprises, as a standard operating procedure, include in their production cost a certain percentage of outlays allotted for technological development. Some of these sizable research funds are transferred to the central organizations--the State Committee for Technological Development and the ministries--with the remainder kept by the enterprises. But both the enterprises and the central organizations can spend these funds only on technological developpment, nothing else. If no new ideas or proposals happen to be submitted, these funds are immobilized as a kind of dead capital. This happens particularly often at enterprises. As for the ministries and the State Committee for Technological Development, as a rule, they spend their technological development funds on fundamental programs, placing orders for the development of these programs with the institutes or acting in response to the proposals of the research and design collectives themselves."

"And the Rubik cube?"

The Fund director laughs: "Yes, precisely. That was outside our scope. The fate of this logic toy forced us to reconsider our operations so as to exploit more fully the creative potential of Hungarian inventors."

Her further comments revealed that quite a few lances had been broken in numerous discussions of this topic. Perhaps the only thing agreed upon was the state of the matter. In Hungary and among the scientific-technical collectives, as well as among individuals, quite a few ideas and projects lacking the needed outcome, that is to say, lacking a market, have been developed. The only reason being--this being a conclusion that was also unanimous--the absence of a person, institution or agency to whom or which any--it was emphasized, any--inventor could turn to from the street, so to speak. And not only turn to but be perfectly aware that he would be attentively listened to, that all his arguments would be thoroughly and competently weighed, and that the scientific and technical and economic possibilities for materializing his idea would be evaluated clearly and substantively in the shortest possible period.

Many suggestions were made in the course of these discussions. Most of them inclined toward the solution traditional in such cases--the establishment of some interdepartmental commission. But later it was reasoned that if the departments themselves cannot handle such problems then the representatives of various departments could hardly be expected to reach agreement either. In this particular case, collegiality would almost entirely do away with personal responsibility. Besides, the time factor--also a highly important circumstance--was an argument against the cumbrous committee approach.

An unexpected initiative was proposed by the bank--unexpected only to the uninitiated. The bank's foreign trade department, of which, incidentally, Erzhebet Birman was a member, provides enterprises with loans for capital outlays to increase exports and, in its practice, it has often found it necessary to nudge them in the direction of innovative solutions. Here the bank staff proceed from the truism that in a depressed and worsening market the maintenance and, the more so, expansion of one's

positions can be assured only by improving the quality of products or introducing new products. When it comes to new products, the bank places virtually no restrictions on the loans it grants. But the bank has not been very often asked for such loans or turned to for help. So then the bank's employees themselves visited the enterprises to offer them funds for the fabrication of new products. Not infrequently they were asked in return: what if it fails? Who would be responsible for the risk and loss?

The bank decided to accept the risk and the responsibility and hence also, of course, to finance the outlays. This is how the Fund for Innovations was set up.

This is an impressive-sounding name. To be sure, the Fund itself is housed in rather modest premises--five rooms on the seventh floor of the building of the Hungarian National Bank. And only eight employees.

Here it seems high time to stress several important factors. First of all, the establishment of the Fund for Innovations and its structure and activities all are in the nature of an experiment prompted by the current economic situation and conducted in the specific and particular Hungarian conditions. This experiment is now some three years old, but even so any more or less definite conclusions cannot be expected for an additional year or two, according to its initiators.

One more important consideration: the Fund in no way supplants the ministries or the State Committee for Technological development. Unlike these, it does not determine the technological policies. Its purposes are purely commercial: to find and sponsor new most promising products and technologies.

Hence also the style of work of the Fund: a maximally business-like and operative approach. Any individual and any organization may turn to the Fund's personnel. As a rule, their proposals cannot be incorporated in central programs or in the development strategies of some particular branch or even enterprise. The Fund for Innovations is the place of resort for the organizations which cannot independently accept the financial risk associated with introducing new products as well.

At the bank they are told yes or no. Before this answer is given, it must be precisely determined whether the invention does display the qualities declared, and whether it will find producers and buyers. The range of the Fund's activities extends from the evaluation of the idea (upon, of course, consultation with specialists and experts) to the marketing strategy. In between these two extreme stages lie research, development, introduction into production, and production itself. The Fund not only finances the entire cycle from beginning to end but also constantly monitors it and keeps all of its stages in its field of vision so that things would not go wrong in any stage. The Fund for Innvations is free to enlist the participation of any expert and any enterprise, but only on a voluntary basis, if they are interested in the topic or in the prospects for its materialization--the Fund is not endowed with any administrative powers in this respect. What it has instead is money and this is, properly speaking, what makes it a fund. Its resources are substantial on the Hungarian scale: nearly 600 million forinths (more than 35 million rubles). One-third of that amount derives from the State Committee for Technological Development; another third, has been transferred to it from the bank's income pursuant to a special permission by the

Ministry of Finance; and the last third has been received from other ministries. To simplify matters it was decided that the Fund need not consult its sponsors about its expenditures and topics selected. The Fund's director is responsible to the bank management alone.

Now about some preliminary results. Less than one-half of the starting capital has already been spent, but already solid accomplishments have been scored. If an accepted topic is successfully implemented, the Fund concludes a contract for receiving half of the profits. Recently yet another step forward has been made: the Fund itself began to participate in capital outlays on the introduction of innovations. Its profits so far are not taxed. The personnel of the Fund believe that greater profits are yet to come, because the introduction of innovations takes time--profits do not come overnight. If the Fund proves itself and becomes consolidated then, in the opinion of its associates, it should become self-financing.

The losses also have been determined: they too are inevitable, after all. They consist of outlays on consultations and expertises regarding both accepted and rejected proposals. Sometimes the process of introducing an innovation has to be discontinued at some intermediate stage when further work proves unpromising. In this and many other cases the forfeited expenditures are written off. That is why, with allowance for the losses, the Fund should receive more than it spends on introducing innovations.

Altogether, the Fund for Innovations has received some 400 proposals. Approximately 140 topics in the most varied directions and of varying importance have been accepted and are being worked out. They range from logic toys (the consequences of the storm raised by the Rubik cube) to a new system for the upkeep of sheep on a specialized farm.

An outstanding example is provided by the cooperation between the Fund and the inventors Gabor Vayda and Laszlo Ravasz. They both are pensioners. Vayda comes from a well-known family of Budapest confectioners. Ravasz is a chemist, a specialist in food canning. They both have plenty of knowledge, ingenuity, energy and leisure time. Until they turned to the Fund, they used to be busy in esoteric ways at home in their kitchens and strike the imagination of relatives and friends with the arcane viands they would conceive and prepare.

Thanks to the Fund these home-cooked "eccentric" dishes became placed on a solid scientific and production base. The inventors were provided with a well-equipped laboratory as well as with the services of a special organization--"Agroindustria" (set up on parity principles by the Fund for Innovations and an agricultural cooperative). The products consist of coffee and cocoa in tablet form, specially sugar-treated fruits that long retain their taste, diabetic icecream, and many other mixtures and powders, sometimes with unexpected qualities, and they enjoy great demand.

...At the International Autumn Fair of Consumer Goods in Budapest a display by "Agroindustria" was included in the Hungarian Pavilion of Food Industry. The products called into life by the Fund for Innovations are gaining increasing visibility and interest on domestic and foreign markets.

1386
CSO: 1814/23

KIRGHIZ SCIENTIFIC ACHIEVEMENTS REVIEWED

Frunze SOVETSKAYA KIRGIZIYA in Russian 9 Sep 82 p 3

/Interview with M.I. Imanaliyev, president of the Kirghiz SSR Academy of Sciences and corresponding member of the USSR Academy of Sciences, by A. Barshay, correspondent of the Kirghiz Telegraph Agency; date and place not specified/

/Text/ Plasmatrons, for the spectral analysis of chemical elements, which were designed by Kirghiz scientists, have found application at the Institute of Heat and Mass Exchange imeni A.V. Lykov of the Belorussian SSR Academy of Sciences.

At the request of specialists from the Institute of Electric Arc Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences, Kirghiz physicists are working to solve a number of theoretical problems related to the calculation of plasma arcs.

With the help of monocrystals, which were obtained for the first time in world scientific history at the Laboratory of Crystal Physics of the Institute of Physics and Mathematics of the Kirghiz SSR Academy of Sciences, scientists of the Siberian Division of the USSR Academy of Sciences have created a new type of laser, which can be re-organized by frequency.

These are only three examples from a multitude of instances which testify to the fact that scientists from our republic are making a substantial contribution to the scientific potential of the country; they are actively participating in the process of nation-wide integration of Soviet science.

The Kirghiz Telegraph Agency correspondent began his interview with M.I. Imanaliyev, president of the Kirghiz SSR Academy of Sciences and corresponding member of the USSR Academy of Sciences, with a discussion of this very important principle in the development of science in our country.

/Question/ Murzabek Imanaliyevich, is it not true and surprising that the science of Soviet Kirghizstan, which has been developing for only a period of several decades, today performs on an equal level with the oldest and the leading scientific centers and is engaged in studying the most complex and timely problems of world knowledge and scientific-technical progress?

/Answer/ Indeed, this does strike one, although today we all consider it quite the usual thing to have, for example, the major scientists of the world come to us in Kirghizia to discuss important scientific problems and to have researchers from our republic, in turn, present scientific reports in Moscow and Leningrad, London and New York, Kiev and Sofia, Berlin and Novosibirsk. Today no one is surprised that the work of our researchers is quoted, that they are cited by the scientists of all continents and that the map which shows the creative links between Kirghiz science figures and the their colleagues in the rest of the country and the world is covered with a dense network of lines.

This ascendancy of science, and of the spiritual life of the Kirghiz people in general, which is phenomenal from the socio-historical viewpoint, would be unthinkable without Great October, without the great friendship of the fraternal peoples of our country, without the far-sighted and inspiring Leninist national policy of our party. And today, in the year of the 60th anniversary of the formation of the USSR, we, the scientists of Soviet Kirghizstan, recall with a feeling of enormous gratitude, the invaluable contribution which the fraternal peoples of our country and the leading scientific centers of the USSR in the formation and development of the scientific potential of the mountainous area.

/Question/ In an August 1932 issue of SOVETSKAYA KIRGIZIYA I found a note on the dispatch of a hydrological team from a comprehensive expedition of the USSR Academy of Sciences to Lake Issyk-Kul. It is clear that this expedition was one of the first Soviet scientific organizations on the territory of our republic. And from what did the scientific institutions of the Kirghiz SSR begin? How did the formation of the national science of the republic take place?

/Answer/ In fulfillment of V.I. Lenin's instructions about the need to study the productive forces of the country and to give scientific assistance to backward regions, the USSR Academy of Sciences sent to Kirghizia in the late 20's and early 30's various scientific expeditions--geological, geographical, medical and veterinary. The scientists of the comprehensive USSR Academy of Sciences expedition did a great deal not only in studying the natural wealth of our area, but also in developing local scientific personnel. There was, after all, not a single scientific institution in Kirghizia at that time; it had no specialists of its own. We were given assistance in training them by the major VUZ centers of the country, Moscow and Leningrad, Tashkent and Kharkov, Sverdlovsk and Kiev, Voronezh and Odessa, Tomsk and Gorkiy.

During the difficult years of the war against fascism many scientific institutions and higher educational establishments were evacuated to our republic. This provided the impetus for further development of science in Kirgizia. And on 13 August 1943 an event, which has gone down in the history of the spiritual life of the Kirghiz people, took place in the summer theater located in the park imeni I.V. Panfilov. At a meeting of representatives of working people and the community of the city of Frunze, the outstanding Soviet scientist, V.L. Komarov, who was at that time president of the USSR Academy of Sciences, reported that by a decision of the Communist Party and the Soviet government, a major scientific center was to be created--the Kirghiz branch of the USSR Academy of Sciences, KirFAN.

And, as always, when the matter concerned a great and important undertaking, the fraternal union republics, the capital of our Homeland, Moscow, and other cities of the country came to the assistance of Kirgizia once again. Tens of major Soviet scientists paraticipated very actively in the organization of scientific research in Kirgizia, in the formation of scientific-research institutions in the republic and in training national scientific personnel. Among those who stood at the sourceof science in Soviet Kirgizstan, were scientists with names known around the world, such as A.P. Karpinskiy, V.L Komarov, K.I. Skryabin, A.Ye. Fersman, D.I. Shcherbakov, L.S. Berg, A.N. Bakh, S.I. Vavilov, V.A. Engel'gardt and many others.

And the Kirghiz branch of the USSR Academy of Sciences was headed by the outstanding Soviet scientist, Academician Konstantin Ivanovich Skryabin. For ten years he directed the young scientific center in the mountain kray, playing an important role in the unification of scientific forces and the further advancement of the economy, the scientific life and culture of Kirgizia.

K.I. Skryabin, the founder of the Soviet scientific helminthological school, which occupies a leading place in the world, who was also a talented teacher, tireless organizer of science and a major public figure, did a great deal for the development of scientific thought in Kirghizia, for the education and creative growth of the republic's scientists. Twice the Kirghiz people elected him as deputy to the USSR Supreme Soviet, and he was honored with awards by the republic. Today the name of Academician K.I. Skryabin is remembered in the Kirghiz State Agricultural Institute, in a street and secondary school in Frunze and in one of the tallest peaks in the Tyan-Shan. The building which housed KirFAN has a memorial plaque in memory of Academician K.I. Skryabin.

At the call of the party and the heart, and in fulfillment of an international duty, many Russian scientists, who came to our kray in the 30's to the 50's, linked their lives to Frunze and Kirghizia. Among those whose names are today spoken with particular pride and enormous respect are the following: M.L. Lushchikhin, one of the creators of the famous fine-fleeced breed of sheep and a corresponding member of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin; N.I. Zakhar'yev, Hero of Socialist Labor, who made a large contribution to the development of the food base

of the mountain kray; G.A. Sukhomlinov, the first rector of Frunze Polytechnical Institute; K.K. Yudakhin, the author of the first major Kirghiz-Russian dictionary and many others.

Eleven years later the Academy of Sciences of the Kirghiz SSR was organized on the basis of the Kirghiz branch of the USSR Academy of Sciences and other republic scientific organizations. The establishment of the republic's academy is one more piece of evidence which demonstrates the interest of the Communist Party and the Soviet government in improving the economy, the scientific and cultural life of the Kirghiz SSR.

Faithful to their international duty, the following major scientists of our country rendered great assistance in the organization and formation of the headquarters of Soviet science: academicians M.V. Keldysh, A.P. Aleksandrov, V.A. Kirillin, P.N. Fedoseyev, A.P. Vinogradov, P.N. Pospelov, M.A. Lavrent'yev, V.P. Barmin, I.I. Mints, A.P. Okladnikov and many others.

/Question/ What kind of creative links do the scientists of Kirghizia have today with their colleagues from other republics?

/Answer/ The cooperation between Kirghiz science and the fraternal Soviet republics and with the major scientific centers of the country has acquired a fundamentally new character. Today we not only receive assistance from the fraternal republics, but we also give assistance to friends, along with the leading scientific institutions of the country, and as equal partners we participate in the resolution of the most diverse scientific and technical problems which are both theoretical and applied in nature.

Every scientific institute of the republic's Academy of Sciences has close links with many scientific institutions in the country and conducts fruitful joint research and experiments. For example, the staff of the Kirghiz academy's youngest institute, the Institute of Seismology, works in close contact with the Institute of Earth Physics imeni O.Yu Shmidt, the Institute of Geochemistry imeni V.I. Vernadskiy, the Institute of the Lithosphere, the Institute of High Temperatures, the Institute of Mineralogy, Geochemistry and Crystal Chemistry of Rare Elements of the USSR Academy of Sciences, the All-Union Institute of Mineral Raw Materials of the USSR Ministry of Geology and many other scientific institutions.

Designs by Kirghiz scientists have received geographically broad application. The Askatesh universal drilling units have shown themselves to good advantage on the Baykal-Amur Mainline construction. The use of Kirghiz moisture gages for petroleum at oil fields in the Volga area, Siberia, the Ukraine, Belorussia and other republics has already yielded an economic benefit of about eight million rubles. The Institute of Oncology imeni N.N. Petrov of the USSR Ministry of Health is using in clinical practice a dosimeter complex designed by Kirghiz physicists. Hardy and productive sorts of apples and plums bred by our Botanical Garden are being successfully tested in the Crimea, Moldavia, Georgia, Azerbaijan and other republics.

8543
CSO: 1814/26

ECONOMIC ASPECTS OF SCIENTIFIC RESEARCH, ITS INDUSTRIAL APPLICATIONS IN UZBEK SSR

Tashkent EKONOMIKA I ZHIZN' in Russian No 8, Aug 82 pp 25-28

[Article by V. Khodzhimatov, Chief, Science and Technology Adminstration, Gosplan, UzSSR, in the column "Science and Technology in Industry": "Scientific Investigation and Integration"]

[Text] "...It is best to employ the achievements of science and technology." -- L. I. Brezhnev

Resolutions of the 26th CPSU Congress and the 20th Uzbekistan Communist Party Congress underscore the fact that, under current conditions, one of the major factors in day-to-day efforts to increase production efficiency and operational quality is the acceleration of scientific and technological progress.

In recent years, much has been done in the republic in the way of unilateral development and consolidation of the technical materiel base of science generally. Not only has the network of scientific research foundations been expanded, but their professional staffs have been increased both in size and quality, while the organizational aspects of the connection to industry have been made sounder, more diversified and efficient. The role of science, and its contribution to the solution of the social-economic and cultural problems confronting the republic, are becoming more and more substantial and significant.

Uzbekistan today possesses a vast scientific-technological potential. Functioning within its territory are approximately 200 scientific institutions, which employ in excess of 34,000 scientific personnel--among whom there are more than 900 doctors of science and 12,500 candidates of science. All told, there are some 80,000 people employed within the broad area of science and the development of new devices and technology.

Operating costs for scientific research organizations in the current year total approximately 100 million rubles, which is a 1.4-fold increase over corresponding costs for the year 1975. The volume of technical materiel invested by ministries and services for the purpose of scientific research and experimental design saw a greater than 1.6-fold increase during the years of the 10th Five-Year Plan.

Scientific institutions as a whole are constantly expanding and deepening fundamental and applied research, concentrating their efforts in those directions which

determine the development of key sectors of the national economy. In the course of the 10th Five-Year Plan, they carried out the development of more than 2,000 major subjects and oversaw the integration of about 3,000 operations into the national economy, with an economic significance in excess of 1.6 million rubles, which greatly facilitated the successful attainment of goals established for that five-year plan.

The results of this research find specific application in the development of highly efficient instruments, materials, equipment, progressive technological processes, new sorts of agricultural cultivars, highly productive strains of livestock and progressive methods of fattening, as well as in securing the feed base.

Strengthening of the link with industry and speeding up of the integration of scientific achievements into the national economy has been made possible by the broad use of the specified program method in the solution of social-economic and scientific-technological problems.

A new, more progressive stage in the organization of scientific research operations was initiated in 1977, when a number of important regional problems were first dealt with using complex programs incorporating an entire cycle of operations--from theoretical analyses to the integration of obtained results in production processes. Even short-term operational experience with these programs shows that they provide specific directivity to scientific research, they make it possible to combine the productive, financial and material resources of subscribing organizations in order solve urgent national economic problems, they permit a reduction in the time frame required for developing products, improving their quality, and hastening their practical utilization.

The 10th Five-Year Plan in the republic accomplished the realization of 13 complex scientific-technological programs aimed at solving urgent problems in the selection of cotton crop varieties, increasing the level of mechanization in cotton production, developing highly effective fertilizers having an increased content of beneficial components and reduced levels of defoliants, while conserving and rationally exploiting the natural resources of the republic, improving the seismic stability of buildings and structures, etc..

Thus, as a result of the implementation of the complex program, "Development of Genetically Selective Methods for Deriving and Introducing New Agricultural Varieties of Cotton"(primary developer--INEBR AN UzSSR[Experimental Plant Biology Institute of the UzSSR Academy of Sciences] and VNIISSKH[not further identified] imeni G. S. Zaytsev) new, high-yielding varieties of cotton appeared, the economic-value indices of which are considerably higher than existing varieties. Four varieties--AN-402, AN-Samarkand-2, Kizil-Ravat and S-6037--were segregated in sections of about 200,000 hectares. The economic impact from the use of the AN-402 variety alone amounted to a gain of more than 22 million rubles in 1980. Thanks to the implementation of the complex program, "Development of the Chemistry and Technology of High-Effectiveness Fertilizers Containing Microelements, Pesticides and Physiologically Active Substances"(primary developer--Institute of Chemistry of the UzSSR Academy of Sciences), a defoliant was developed based on magnesium chlorate in combination with fertilizer components, which is now being used throughout the republic. In 1980, 280,000 hectares of cotton plantings were treated with a low-toxicity defoliant of the UDM[not further identified]-type. The economic effect of this

treatment was a gain of 18.9 million rubles. Extensive field testing was done with complex liquid fertilizer(SUM-UZh[not further identified]), the economic effectiveness of which from its use on cotton crops amounted to a gain of 10-25 per hectare. Positive results were obtained in the implementation of a number of other programs.

Researchers in the republic are presently engaged in implementing 19 regional complex scientific programs which were included in the Gosplan for UzSSR economic and social development for 1981-85. The realization of these complex programs, on the one hand, assures a concentration of research efforts, material and financial resources of scientific research and engineering design organizations on finding a solution to the most urgent objectives, while, on the other hand, it will provide for more rapid integration of new technologies, scientific instruments, field equipment, cotton varieties and other agricultural crops, as well as measures needed for the more rational use of mineral resources, including fuel resources in the republic, and so forth.

All research work--from the birth of a valuable idea, to its successful utilization in the national economy--can be concentrated entirely within huge industrial research firms. Today there are eight such firms located within the republic: "Kibernetika" imeni R. R. Shreder, devoted to fruit-growing and viniculture research; "Signal"; "Tekhnolog"; "Sredazsel'khozmash[Central Asian Agricultural Machine Building Association]; "Uzavtotranstekhnika"[Uzbek Motor Transport Equipment Production Association]; "Silikat"; and "Uzbekproyektmebel'"[Uzbek Association for Furniture Design].

Despite the relatively brief period of time which has passed since the creation of these IRA's[industrial research associations], a number of them--including "Kibernetika", "Tekhnolog", and "Signal"--have accumulated a vast fund of practical know-how. From year to year, the amount of industrial research conducted by these IRA's has steadily increased, thereby promoting improvement in the methods and means of production in sectors of the national economy within the republic which are affected by their particular research efforts.

The total of the gross output of the IRA "Kibernetika" in 1981, which amounted to 6,225,000 rubles, was nearly double that of 1977.

In the IRA "Signal", the volume of scientific research and experimental design work for the cotton ginning industry in 1980 reached 955,300 rubles, which is almost twice as much as in 1976. The total value of implements produced in 1980 approached 1.5 million rubles, or almost six times as much as compared with 1975. In 1975, four equipment nomenclatures were issued, as opposed to eight in 1980. Among these were the PL-1 cotton lint sampler, the LKM-2--a device for removing coarse and fine waste products from raw cotton samples, and the ASKh-1--an instrument for gauging raw cotton varieties using digital readout.

As a result of economizing measures put into effect during the 10th Five-Year Plan, 5205 production personnel at the IRA "Tekhnolog" were conditionally freed for other tasks and a savings of 7615 tons of metal was realized, the economic impact of which amounted to a gain of 87.2 million rubles. Included in the major innovations being put into effect by these associations were such items as polyethylene storage tanks

and machinery associated with the use of chemical processes in the cotton ginning industry, which were developed by "Uzbeksel'mash". Their introduction has produced a savings of 685 tons of sheet metal with an economic impact amounting to 498,000 rubles. The implementation of automatic metal-working machinery developed by these IRA's for use in the manufacture of rakes has freed 98 workers for other purposes and provided an economic gain of 291,000 rubles.

The work of the IRA imeni R. R. Shreder has resulted in an almost twofold increase in the growth of production of nursery planting stock and fruit and berry crops. The production of fruits and vine crops on farms of this IRA has increased rapidly during this specific period(1975-80) from 79,000 to 100,000 tons; new grades for winery products have been established. Profits for the IRA for the past five years totaled 19,802,000 rubles, as opposed to the projected goal of 15,942,000. During these same years, research and development efforts of the association were also expanded, which resulted in the development of an integrated system for controlling the codling moth, the grape leaf roller, and several other scourges of fruit and viniculture, as well as the introduction of new, high-yielding varieties of fruits and vine crops, etc..

A scientific-industrial training association has been established within the Ministry of Higher and Secondary Specialized Education for the purpose of conducting co-educational testing of scientific and production personnel, aided by the active participation of student organizations. This type of testing is being carried out by the Tashkent Institute of Textile and Light Industry in conjunction with the Tashkent textile combine. The state university of Samarkand, along with industrial organizations of the Akdar'inskiy Rayon, is engaged in the introduction of biological methods of agricultural pest control.

Numerous similar successful solutions to major national economic problems and examples of close cooperation between science and industry may be cited. Additional evidence of this is provided by the fact that scientific researchers in the republic are daily turning out approximately 200-300 perfected technical scientific products for use in sectors of the national economy.

The results of the integration of such products into production processes could be a good deal more substantive. Even now, at a time when many useful contacts have been built up between science and industry, when even the most diverse modes of their interaction have been put into operation, still a portion of the scientific research effort is nonetheless not finding practical realization. During his recent stopover in Tashkent, comrade Brezhnev underscored the fact that we are "at the present time integrating into production processes slightly more than half of the research developments being made available to the national economy." Unfortunately, it is not infrequently that the time periods required for the integration of specific operations reach ten years or more.

Why is this? One of the major reasons is the fact that in a number of cases, the industrial design plans for the integration of scientific and technological developments represent a considerable variation from the corresponding plans of scientific research institutions.

On the other hand, the research efforts of scientific institutions in the republic do not adequately reflect issues which concern the development of the cotton and

fuel-power complex, the rational use of water and mineral resources, and development in the field of chemistry. Too little research is being done relative to the development and fulfillment of food-supply programs and the production of consumer goods. Meanwhile, the scale of research work is but slowly expanding in such critical areas as biotechnology, corrosion control, protection of the biosphere, and several others.

The extent of the research and development which has received full-scale realization in sectors of the national economy is of little importance. Moreover, full use has not been made of the potential of scientific, design-engineering and experimental testing organizations of the republic in the creation and integration of fundamentally new technologies, machinery, scientific instruments, cotton varieties and high-quality materials.

The primary reasons for the divergence of specialized ministries, departments and scientific research organizations from their proper direction are the regularity with which major projects are left unfinished, the inadequacy of essential industrial experimental testing, and the incompleteness of technical standards documentation.

Thus, the following research projects were not adopted for integration into sectors of the economy: Institute of Electronics, Academy of Sciences, UzSSR, "Automatic Device for Vaporizing Easily Fusible Materials"--due to negative results from testing; Institute of Mechanics and Seismic Stability of Construction, UzSSR Academy of Sciences, "Recommendations on the Optimal Concentration of Compounds Made from Oil Refining By-Products to be Used for Erosion Control Treatment of Soils of the Fergana Oblast"--owing to the fact that materials needed for the research were not sent to the UzSSR Ministry of Agriculture in sufficient amounts; Institute of Geology and Geophysics, "Recommendations for the Establishment of Geochemical-Mineral Criteria in Prospecting for Lead-Zinc Deposits in the Almalykskiy Rayon"--as a result of its need for modification, in the opinion of the UzSSR Ministry of Geology.

An analysis carried out by the Administration of Science and Technology of the UzSSR Gosplan points up the fact that ministries and departments possess the capability for significantly reducing time frames required for integration. Furthermore, this capability is called upon most often when industry itself has a specific interest in accelerated delivery of the final result. For this very reason, a great deal of attention has been given by the republic to increasing morale and material incentives for both economists and scientific researchers.

At the same time, the productivity base of research institutions must be developed. The facts speak convincingly of the advisability of further establishment of industrial research associations.

Much attention is being focused on the preparation of specialists for the new and promising directions in scientific research. This preparation is taking place both within the republic and in leading scientific centers and VUZ's in Moscow, Leningrad and other cities around the country.

These and other problems are of extreme importance and concern, since their solution will in large part determine the effectiveness of scientific research, as well as the rate and scale at which the most important research results will be integrated

into the national economy. And it is entirely in order that, in the CPSU Central Committee and USSR Council of Ministers resolution "On Improving Planning and Reinforcing the Effect of Economic Mechanisms on Raising Production Efficiency and Operational Quality", much attention is directed to a speeding up of scientific and technological progress, specifically, it requires the USSR State Committee for Science and Technology and Gosstroy, together with the USSR Academy of Sciences, to develop programs for solving important scientific and technological problems, as well as problems involving the complex use of natural resources. Such programs are to make use of the results of fundamental and applied research and to establish ultimate goals, technical and economic results, time-frames and stages for the implementation of industrial operations.

9481
CSO: 1814/3

STAFF FIRINGS AND DEMORALIZATION AT UzSSR ASTRONOMY INSTITUTE DEPLORED

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 18 Jul 82 p 2

/Article by A. Tarasov, KOMSOMOL'SKAYA PRAVDA special correspondent, Tashkent: "The Spectrogram: Why Young Scientists Refused to be Co-Authors With Their Director" under the rubric "Assignment in Response to an Alarming Letter"/

/Text/ That was one of the most unexpected letters ever received.

One is reminded of one's own youth in the early 1960s. When we became freshmen at Tashkent University and studied together, though to be sure majoring in different areas. The fellows who chose to major in science had entered upon a rosy path. There was the astronomy club, the eminent professor, the young, talented and energetic scientist. They went with him to the observatory and traveled with him on an expedition. The 20 years old youth, charming and vivacious. An alpinist, a designer and a jack-of-all-trades....With the guitar in hand somewhere at a bonfire in a mountain valley.

Physics had the glory and poetry was in decline. I envied those science majors when they superciliously took inventories of galaxies and mesons. Their plans for the future extended to the Andromeda Nebula, to pulsars, black holes and farther, still farther.

When you are pushing 40, you are more familiar with the price of terrestrial gravitation and the mountain passes of life. Only the pulse-beat of youth remains constant. The student astronomy club has long been forgotten; now the more solid name "department" applies. But when they left for new expeditions and climbed new mountains, they remained the same as when they were in their freshman year--enthused with a new idea. And the generator of ideas remained the same man, the already well-known astronomer, the head of the Working Group on the Problem of "Astroclimate" under the Astronomy Council of the USSR Academy of Sciences....

I listened to the complimentary comments of their Moscow colleagues: "They broke through and achieved the impossible. On Mt. Maydanak they founded the country's future astronomic base practically without any capital investments, fired by their enthusiasm alone. They laid concrete and worked as stone-masons while installing the telescopes. There was no way you could stop them from doing it. Valera is just to be envied for getting together such a talented and well-knit collective. How could this happen to them?"

/Following is the text of the letter with which this article is concerned./ "Dear Editors: This letter is written by the Komsomol members and young associates of the Department of Variable Stars at the Astronomy Institute of the UzSSR Academy of Science....On 11 June of this year the text of a decision by the presidium of the academy was read at a general meeting. Essentially, that decision reduces to the dismissal of 'malcontents' who had dared to make critical comments about the department head, V. S. Shevchenko, concerning his scientific, moral and administrative qualities...."]

At first it had been just a dispute which, moreover, apparently took place at the wrong time and could have been avoided, even when the young colleagues--quite young, surely the third generation--declared that they could not sign the article. The primary material in that article has been, so to speak, stretched in order to infer bold and beautiful-sounding conclusions. The conclusions were made by the team director, while the spectrograms themselves were obtained by the young scientists. Despite the prestige attached to being named as co-authors with a sufficiently authoritative scientist, in an article to be published in a solid astronomical publication, the young scientists regarded as more important that striving for scientific accuracy which until then had always been inculcated in them.

At times during the busy period of expeditionary activities, the processing of data, administrative work, etc. the matter was mentioned to the main author. Of course, the first to mention it were the veteran scientists in the department. One of them, Vladimir Kardanovich, a candidate of sciences, was the first to resign from the co-authorship. After the dispute at a seminar, he was joined by the young scientific associates Sasha Kolesnikov, Semen Gol'dshteyn and Natasha Shutemova. After their return from a scientific mission, Ul'zhen Nurmanova and Vladik Kotyshev also had resigned their co-authorship.

This is a murky business. Actions like these, after many years of devoted labor. But so far nothing irreparable has been done. It is still possible to walk over from the conference room to the department, peruse these spectrograms, negatives and charts and dispute till one's voice becomes hoarse and till late in the night.

It is still possible to prove that you are the same young leader, like-minded and a faithful companion on expeditionary trails and in the labyrinths of star clusters. You dispute and, whether you remain unconvinced or convinced, in either case this means scientific progress.

But Shevchenko, instead of continuing the debate about the spectrograms, acts in a manner that, in astronomical language, can be explained only as a temporary eclipse.

He wrote the administration a letter in which he blamed one individual for everything. That individual allegedly has launched a campaign of malicious slander against him, the department head. That individual persuaded the green youth to refuse co-authorship with the object of discrediting the department head as a scientist.

The letter shocked the collective when read to it.

That individual, whom I came to know on my assignment by this newspaper, is Shevchenko's longtime associate Gennadiy Shanin, chairman of the local committee at the institute and a young party member.

The affair was so complex that it could only be disentangled by a commission of the presidium of the Uzbek SSR Academy of Sciences.

First of all, it examined the official declaration signed by 12 associates of the department. Both the veterans of the first expeditions and the novice scientists informed the high commission that it was all the other way around. That Gennadiy Shanin is a genuine scientist and a principled communist. That the accusations against him are fantastic. And that Shevchenko's reaction is due to the wish to cover up his bad conscience as a scientist.

Stress situations in human beings also have spectrograms of their own. These spectrograms reveal lines of nobility and baseness, duty and treachery, empathy and indifference, understanding and emptiness.

This entire spectrum has now unfolded itself before the eyes of the young people.

First of all, the commission undertook to investigate the identity of the "instigator" of the signatures and opinions. The deplorable and simply horrible term 'the group' was employed.

All right, the group. A group is a number of persons sharing a common opinion The esteemed commission along with the administration of the institute, including Shevchenko and a number of other authoritative associates, also is a "group" with its own point of view. What is then so bad about it? What matters is who is right.

But the persons summoned, one after another, before the commission, were amazed to be told that their opinion was not their own but a compromise with their conscience due to Shanin's intrigues. They disagreed. These people, mathematicians and astronomers, believe that every proof should be as accurate as a medical fact. And they have such proofs--proofs justifying Shanin's scientific work, his good name and, partially, the unfortunate spectrogram. But the commission stubbornly asserted: "It is disgraceful for you to have no opinion of your own and be under the thumb of intriguers." It was then that Natasha Shutemova, a fragile and delicate girl, burst out:

"You're being demagogic!"

Oh, what a joy! Have such bold words ever been uttered before?

Natasha apologized.

"We need no apology. Take a sheet of paper and write down an explanation."

Natasha took the paper and wrote that, in her despair, having lost the hope of being understood by the commission, she said something in the heat of the moment for which she apologizes. She signed and dated it.

In reply, she was told: "This paper will serve as the grounds for your dismissal. You may immediately write a letter of resignation."

Such was the style of the investigation. A chance phrase, the question of the real or imaginary blame for some secondary matter, raised a storm of fury. But this had nothing to do with the heart of the matter.

Why did, for example, the chairman of that commission, the Academy's Vice President P. K. Khabibullayev, have to order Canditate of Sciences Ul'zhan Nurmanova to get up from her seat in the presence of the entire staff of the Institute and sacrilegiously derive enjoyment from another's personal tragedy which has nothing to do with the matter under consideration? In his desire to undeservedly humiliate his young opponent, he hardly added lines of wisdom to the spectrum of his judicial authority.

In the end, all the protesters received their due. A public announcement was made naming those penalized by being deprived of a voice in the dispute with the department head and stating the reasons why in each case. The younger scientists /according to that declaration/ have accomplished little as yet, and they are not to be held responsible. As for the older ones, some of them received housing from the academy and by engaging in the dispute they display an immoral attitude, while others have published too little, others still have been slow in completing their candidate degree, while the remainder did defend their degree and expressed at the end of their articles and reports traditional gratitude to V. S. Shevchenko for his guidance, assistance and advice.

Was this sweeping denial of collective opinion accidental?

Some time in the past Valeriy /Shevchenko/ and Gennadiy /Shanin/, while still long-time associates, had taken part in another scientific dispute. They had been of the same opinion, and not they alone, since they were supported by many of the country's scientists. They were evidently right: the VAK /High Degree Commission/ refused to accept the doctoral dissertation of an associate of the Institute.

But now Shevchenko deeply regrets his "participation." He put in writing, black on white, that he had made a fatal mistake. That he was involved in this sordid business by that very Shanin, that only now that he has become another "victim," he realizes what it was all about and states so accordingly.

This is a painful subject. Even if a dissertation is rejected for right reasons, this still is a blow to the Institute. It is not every day that a doctoral defense is held within the walls of the Institute. And now it turns out that one individual is responsible for this.

Arrows rained from the Olympian mountain-tops. A decision by the presidium of the UzSSR Academy of Sciences smartly termed both the past and the present polemics "organizational comments....aimed at discrediting," and named as their author Gennadiy Shanin, the head of the department for the automated processing of measurements. He was given a severe reprimand. At the same time, two junior scientific associates were reprimanded "for unethical behavior during the work of the commission." And lastly but most importantly, the presidium directed the Institute administration to reduce the astronomer personnel of the department by 10 persons as of 1 July.

In Tashkent, at the Institute and the Academy, I was told at great length and graciously about the need to make science profitable.

This justifiably sounding rationale was used by the Institute to discharge staff members working on a contractual basis, that is, producing the most direct benefits to the national economy. Here is a bookkeeping fact: the budget for 97 "tenured" associates amounts to 320,000 rubles. Those working under contracts /that is, outside consultants/ provide consultations worth 515,000 rubles, and the volume of this work is increasing each year. Moreover, this volume of work is designed to be handled by 51 persons, to be exact, but there were actually only 37, including 5 administrators. And now 10 of them have been riffed. And they happen to be the best trained and best qualified ones. What a strange attitude toward scientific consultants, working on a cost-effective basis whose consulting performance had till the last been irreproachable. What a strange attitude toward the system of outside contracts, which as been brought to the brink of disaster.

The meeting also attempted to obtain a mathematical answer to this mathematical question.

P. K. Khabibullayev logically explained to the astronomers: "The Institute should rectify the situation. Otherwise we would have to cut the staff in half. We need precisely these reasons....

This is the whole story in a nutshell.

But what about the man whom many do not greet now, who feels himself the object of now irreconcilably hostile stares from both old comrades and young disciples? Of course, he is dismayed.

"This is a catastrophe. Everything that I had created for nearly 20 years has collapsed."

But what is it that has stopped the young scientists, who risked their positions, their scientific careers, the chances for getting private housing of their own, and perhaps even expulsion from the Komsomol--as they had been told during the deliberations of the commission--from defending the insulted department head just as fervently and selflessly?

This matter, too, has its own spectrogram.

That spectrogram reveals lines of doubt, initially only subconscious doubt. Doubt that grew to become more and more alarming as Shevchenko hung more and more "lanterns" on the scientific firmament, "lanterns" that engendered years-long elucidations and corrections. In August 1975 he turned out to be an overhasty discoverer of a new star in the constellation Cygnus, antedating it one day prior to its nova. He had made some mistake in calculating the background of Mt. Maydanak so that afterward it took the entire astronomer community a long time to solve this rebus.

It is not pleasant to recall ancient mistakes. No one is free of them. But it was only recently that Natasha Shutemova received the response to their joint article (for her the first in her life): "However, the article...does not provide an adequate idea of the work done by the authors....No observational data corroborating this conclusion are presented...."

One feels ashamed of one's first attempt and resolves to be more careful in the future. Another young co-author ran all the way to the post office to send an urgent message asking to recall from publication the article he had co-authored with Shevchenko and delete the inaccuracies from the print. These are lines of purely scientific absent-mindedness. But there is also financial absentmindedness in keeping records of the allowances paid to the participants of field expeditions. Of course, there are a thousand valid reasons why the leader of the expedition has to keep in his pocket a contingency fund deducted from the total allowances. But the aftertaste manifests itself. Novice participants in an alpine expedition notice that the team may lack bread and other food for weeks at a time and subsist instead on buck-passing among administrators, but once the department head arrives at the mountain camp, things take a sharp turn and the refrigerator suddenly is stuffed with everyting, including even grapes and melons.

It is shameful and repellent to observe and remember these trifles. But now that a spectrogram is needed, they became revealed on it.... The director is aware that a doctoral candidate must be assigned to gather the data he needs for his dissertation, but if the candidate happens to forget working as well on the topic of interest to the director himself, a year may pass before the novice may be permitted to use the telescope.

This spectrum reveals a lot, and a listing of its nuances would be too long.

But the most important revelation is that young people who devoted as many as 10 years to laying concrete with their own hands on their beloved astronomic mountain learn that all their work was for nothing once the towers of the telescopes arise. They learn that their enthusiasm was defeated by organizational inefficiency, that the selected site has to be abandoned. This is a great blow. There is no longer time nor energy left, nor do the privations of their families warrant it, for them to devote another 10 years to construction work while at the same time performing scientific research. The meter telescope worth 800,000 rubles has been lying disassembled in crates at the foot of the mountain for 3 years now. And no one knows how much longer it will lie there. And yet, so many hopes had been placed in it--and in the administrators.

...Perhaps he is accustomed to striding without looking back, confident in the presence of the faithful retinue behind him? The habit of being the star....But he looked back--and did not behold the familiar admiring gaze of the young. And he was terrified that someone else might be respected more....

He rises--to proceed to the session of the Commisson on the Reduction in Force.

"Surely, I wrote that letter in the heat of the moment....But now it is no longer up to me."

I asked the director for permission to attend the session of the commission. To listen to the reasons advanced separately for discharging every individual concerned. The director refused me permission. He said that it was an internal affair of the Institute and "we personally will make no decision today. That will come some time later."

I do not know why he had to say that. As I descended the stairs I saw, coming from the opposite direction, Gennadiy Shanin, who had by then been summoned to the office. He entered it and was told that he should look for another job.

Thus, Shanin was the first to be riffed. He, Gena, the chairman of the local trade-union at the Institute, with whom alone Schevchenko had spent the first two days on the top of Mt. Maydanak in August 1970. At that time, owing to bad weather, the helicopter could not lower the panels for the first hut. And in the evening there had been time for a long discussion of the future of that mountain, of telescopes, and of oneself.

Gena Shanin, who had defended with such eclat his candidate dissertation on stellar spectroscopy. Gena, whose cycle of work was listed in 1978 among the major achievements of Soviet astronomy. Gena, who had mixed the concrete like everyone else, built and repaired instruments, and was the responsible coordinator of an important contract assignment. As early as last spring he still had been the right hand of the department head. Now he is blamed for having in the past been right, along with Shevchenko, in opposing the acceptance of a doctoral defense, and for being, more recently, supported by the collective.

After Shanin, Gena Sigal, a recent chairman of the council of young scientists at the Institute and member of the local trade-union committee, entered the office. He had been working at the Institute since 1975. He won the first prize at an Institute conference for developing and building a unique infrared spectrometer. He took part in the construction of the 80-cm telescope, now ready for transportation onto Mt. Maydanak, as well as in the construction of a field depot for an expedition under a contract, and he was a member of the field teams. Reasons for his discharge? "We shall later post them on the bulletin board."

The director paternally praised the ardent and impulsive engineer for declining his offer to help him find employment elsewhere. "You're an example of the independent specialists we train here." The fellows in the department, later, asked, "What about 'him'?"

Gena said: "He is sitting as if turned to stone, looking at the window."

In general, Valeriy Shevchenko has outwardly changed the least of all. His figure remains just as trim and athletic and there is not a single gray hair on his head with its short-cut dark hair. It may be that he will once more pick up a guitar to entertain newly hired staff and once more chat about nebulas and fascinate with "dark holes."

It may be. But the eyes of those who remain behind will continue to stare accusingly. Together with young scientists from allied departments I "figure out" from the roster of positions other candidates for riffing. My interlocutors are Mukaddam Azamova, the secretary of the Komsomol bureau, Bakhtiyar Abdusamatov, chief engineer, and Shavkat Sharipov, junior scientific associate. They feel deeply for their comrades. Shanin? Isakov? Nurmanova? But they are the conscience of the Institute, persons who selflessly devote themselves to science, whether on the mountain at the telescopes or in the shop behind the carpenter's table or in the laboratory.

When I part with them, Shavkat firmly grips my hand and declares: "It is untrue that they created an unhealthy situation in the department. Just the opposite: they worked in a talented manner, spoke the plain truth and defended truth in science and in life. I am convinced that this all will be understood."

I too. Incidentally, the spectrograms with which all this had started (and with which it could have ended) have so far remained unexamined by anyone. No one has bothered to assess the scientific falsification, because the administration expended all its zeal on "maintaining order."

But how can such "order" be interpreted? Hiding one's head in the sand? Consenting to any injustice and scientific and moral forgery? Refusing to express one's own opinion out of fear or careerism? I believe that any self-respecting scientist would be horrified by such an outcome. Why should members of an academic commission be so upset by that solidarity, that ardent glitter of the intelligent, candid, demanding and passionate young eyes?

May this always be so. This is to be viewed as gratifying!

1386
CSO: 1814/22

SCIENCE AND FOOD PROGRAM DISCUSSED AT ARMENIAN MEETING

Yerevan KOMMUNIST in Russian 15 Oct 82 p 3

/Unsigned Article: "In the Main Direction: A General Meeting of the Armenian SSR Academy of Sciences with Participation by the Republic's Ministry of Agriculture"/

/Text/ Science has a special role to play in the implementation of the Food Program. This was discussed at a general meeting of the Armenian SSR Academy of Sciences with participation by the republic's Ministry of Agriculture; it was opened by Academician V. Ambartsumyan, president of the Armenian SSR Academy of Sciences.

"In the decisions of the 26th congress of our party and the May (1982) plenum of the CC CPSU," he said, "particular emphasis is given to the role of science in the realization of the Food Program. Scientific workers must become aware of the importance of this problem, which requires a comprehensive approach and joint efforts by specialists. The strategy of scientific search, the main direction of our work, calls first of all for an increase in the effectiveness of the fundamental and applied research in the area of agriculture. On the basis of generalized experience, scientifically-grounded recommendations must be developed for the further improvement of specialization, concentration and inter-farm cooperation in production, the application of progressive, new forms of labor organization and of incentives for that labor.

The CC CPSU plenum, V. Ambartsumyan emphasized, made it mandatory for workers in science to increase the effectiveness of scientific investigations into the basis of new achievements of biological, agricultural, chemical, physical-technical, economic and other sciences, and to develop effective methods and proposals to ensure the implementation of the Food Program.

V. Kazaryan, the academic secretary of the Division of Biological Sciences of the republic's academy of sciences and academician of the Armenian SSR Academy of Sciences, presented a report on the tasks of the ArSSR Academy of Science in the implementation of the USSR Food Program.

The intensification of agricultural production, which is the most important factor in the fulfillment of the Food Program, is possible only on the

basis of scientific and technical progress. In this regard it is particularly essential to expand fundamental and applied research in the area of the natural sciences, emphasized the speaker. The development of the productive forces in the agriculture of Armenia must proceed along two paths: the intensification of land use and the expansion of land areas. He went on to talk in detail about the rational use of irrigation water and the need to design progressive new methods of irrigation.

Expanding the use of chemicals on the land presents large tasks for the Institute of Organic Chemistry. They include the development and synthesis of fertilizers for food crops: the fertilizers must be comprehensive in nature and long lasting in their effect.

The Institute of Microbiology has accomplished definite work in this area.

Research conducted by the Institute of General and Inorganic Chemistry is also of interest. A special method has been developed here which makes it possible to obtain granulated organic fertilizer from municipal waste water. More than 50 tons of these substances have undergone testing on various agricultural crops, and they have provided positive results.

In his report entitled "The Republic's Agricultural Science and the Implementation of the USSR Food Program," M. Melkonyan, deputy minister of agriculture in the Armenian SSR and doctor of economic sciences, said that in recent years gradual intensification has been the main feature in the development of the republic's agriculture. The production of poultry, hogs, eggs and vegetables have been largely shifted to an industrial footing; intensive orchards have been planted, and mechanized complexes for the production of milk and meat have been handed over for operations. The scientists of the republic have played an important role in this work.

Definite work has been accomplished by the breeders, too. Varieties which they have recommended have become widely distributed, and in the near future this will make possible a significant increase in the yield of fruits and vegetables, as well as a significant strengthening of the food base.

Definite success has also been achieved in the area of breeding agricultural animals. The Caucasian gray variety of cattle was developed in the republic; it has become common in Armenia, Georgia, Azerbaijan and Kazakhstan.

The speaker noted further that scientists have carried out significant work in the development of effective new means for preventing and treating agricultural animals.

The list of the scientists' achievements also includes the development of methods for cultivating semi-desert lands--kirs and saline soils, the development of new technology for cultivating vineyards, which will make it possible to nearly double the yields. The technology has also been developed for the planting and cultivating of intensive orchards, which will have yields which exceed those of conventional orchards by 2- to 3-fold. and will reach 300-400 quintals per hectare.

However, the agricultural crop yields in the republic are not high on the whole. The rural workers are waiting for science to develop advanced new equipment and technology for intensifying sectors according to agricultural zones, the speaker emphasized. Much also remains to be done in the area of the biological sciences. It is essential to develop the genetic basis for the breeding of food crops and animals.

The Food Program stipulates a substantial improvement in the diet of the Soviet people; it calls for a significant increase in the most important products, specifically meat and dairy products. An increase in the production of those foodstuffs which have top-priority significance must be achieved purely as a result of increases in productivity and improvements in the structure of the herd.

The further increase in the production of foodstuffs derived from animal raising is, as is well known, determined by the fodder base. The scientists face urgent tasks in the development of effective technology for accumulating, transporting, storing and processing fodder.

The task of land cultivation science is to develop a system of agrotechnical measures which will allow for the maximization of the degree to which the potential opportunities for crop yields are realized.

The scientists who took part in the discussions noted that the Food Program differs substantially from the usual plans for economic and social development. It is goal-oriented and comprehensive, it includes the resolution of economic, social, organizational, scientific and technical problems. The program does not simply set out tasks; it also points out ways and methods to realize them. The reports contained concrete proposals for the intensification of scientific research, and the accelerated application of the results in all areas of agriculture.

The general meeting adopted a detailed decision which recflected the concrete tasks facing the scientific institutions of the republic in the realization of the Food Program.

The following people participated in the work of the meeting: V. Galumyan, the secretary of the Armenian Communist Party Central Committee; R. Svetlova, the deputy chairperson of the Armenian SSR Council of Ministers, and G. Azatyan, deputy head of the Department of Science and Educational Institutions of the Armenian Communist Party CC.

The general meeting of the Armenian SSR Academy of Sciences concluded its work.

8543
CSO: 1814/27

AZERBAIJANI SCIENTIFIC COOPERATION DISCUSSED

Baku BAKINSKIY RABOCHIY in Russian 5 Sep 82 p 3

/Article by A. Nadirov, chief academic secretary of the presidium of the Azerbaijan SSR Academy of Sciences and corresponding members of the republic Academy of Sciences: "Horizons of Cooperation"/

/Text/ The dynamic growth of the economy, the development of science and the genuine blossoming of culture in Soviet Azerbaijan within the friendly family of the peoples of our Homeland has contributed--especially in the 70's and early 80's--to the significant expansion of international scientific ties of the republic's Academy of Sciences. The achievements of Azerbaijan scientists have received broad worldwide recognition, and many representatives of the large army of the republic's scientists enjoy deserved prestige in the international scientific community. There is evidence of this is the fact that about 20 Azerbaijani scholars have been chosen as members of international and national organizations and societies: the Bulgarian Academy of Sciences, the U.S. Mineralogical Society, the Japanese Society of Geologists, the International Society of Soil Scholars, the Turkish Linguistic Society, the Entomological Society of Czechoslovakia and others. Works by the republic's scholars have been published in more than 60 countries of the world, and every year the number of such publications grows.

On the basis of the decisions of the 26th CPSU Congress and the 30th Congress of the Communist Party of Azerbaijan, the republic's Academy of Sciences contributes actively to the development of international scientific links, to the intensification of cooperation with the academies of science and other scientific organizations of the socialist countries. In recent years this cooperation has not only expanded significantly; it has also acquired new organizational forms.

Many of our scientific-research institutes are successfully conducting joint work with scientific institutions in the socialist, capitalist and developing countries. For example, samples of corrosion inhibitors have been handed over to the Hungarian People's Republic for laboratory studies and field tests in accordance with points of the working program of the Azerbaijan SSR Academy of Science's Institute of Inorganic and Physical Chemistry. The field tests conducted in Hungary at gas wells yielded positive results.

The inhibitors, which were created in Baku, have no less a protective effect than the foreign ones which are currently being used in Hungary. Not unexpectedly, the Hungarian scientists have expressed a desire to continue working with Azerbaijan chemical workers within the framework of bilateral cooperation.

In accordance with a decisions by the State Committee on Science and Technology of the USSR Council of Ministers and the presidium of the Azerbaijan SSR Academy of Sciences, the Institute of Geology, is working with a branch of the Central Geological Institute and the Institute of Engineering Geology of the CSSR on the development of geochemical criteria for evaluating the prospects for oil and gas deposits in the Southern Caspian, the Kurinskaya basins (Azerbaijan SSR) and in the Venskaya basin (CSSR) and in the internal Carpathian basins.

A comparative analysis has provided grounds for singling out prospective zones to explore for oil and gas deposits. Joint expedition work in Azerbaijan and Czechoslovakia, using portable laser gas analyzers, has made it possible to recommend the use the of a gas-geochemical scheme to search for deposits and to monitor the air tightness of underground gas storage tanks.

Scientists from the most diverse countries of the world show enormous interest in the activities of Azerbaijani scientists and the results of their research. Many materials about science in Soviet Azerbaijan and the about the works of our most prominent scholars are published abroad. For example, material about G.Abdullayev, president of our republic's Academy of Sciences was published in Iran; materials on Academician G. Aliyev were published in Holland. Information on K. Karayev was published in the USA and information on Z. Buniatov was published in Iran. Materials on G. Arasly were published in Turkey, on M. Shiraliyev in Hungary, on A. Sumbatzade in India; and in the FRG materials were published on two corresponding members of the Azerbaijan SSR Academy of Sciences, B. Vagabzade and F. Amirov, and information on L.Kerimov was published in England.

From year to year international ties are expanding between the Institute of the Peoples of the Near and Middle East of the Azerbaijan SSR Academy of Sciences, on the one hand, and the scientific centers and scientists of the Polish People's Republic, the People's Republic of Bulgaria, CSSR, GDR, the Hungarian People's Republic, Iran, Turkey, Iraq, Libya, England, France and other countries, on the other hand. Scientists from the institute participate quite actively in international congresses, conferences and symposia on problems of Oriental studies. Works by Azerbaijani Orientalists have become well known and received academic recognition abroad. In recent years alone more than 70 of their scientific works have been published in Bulgaria, the GDR, France, Iran, Turkey, Afghanistan, Iraq and other countries of the Near and Middle East. Representatives from Bulgaria, Turkey and Iraq have successfully completed graduate studies and defended their candidate dissertations at the institute.

The academic community of foreign countries responds with interest to the results of research by Azerbaijani Orientalists; evidence of this can be

seen in the numberous positive comments, references to the works of our scholars, as well as reference and other books published abroad which contain information on the state of Azerbaijani Oriental studies.

I would like to emphasize particularly that progressive scholars of various countries and continents typically have a desire to cooperate and show a willingness to help each other--this is done, after all, for the good of humanity. We, the scholars of Soviet Azerbaijan, ourselves give as well as receive this kind of assistance. Here is one example: last year D. Kagramanov, director of the republic's manuscript fund, and a doctor of philological sciences, worked at the Institute of the Languages of the Peoples of Asia and Africa at Uppsala University and in the humanities department at Stockholm University. The Azerbaijanischolar became acquainted with unique manuscript copies of compositions by Azerbaijani authors of the 12-18th centuries, among which a special place belongs to the "Khamsa" of Nizami Gyandzhevi, which was rewritten in 1439 and illustrated with 52 colorful miniatures.

Direct contacts and lively interaction between Azerbaijan scholars and their colleagues from various countries have a positive effect on the development of scientific exchange and help to provide new materials on the cultural history of the Azerbaijani people for the republic's manuscript fund.

The AzSSR Academy of Sciences continues to work successfully with scientific institutes in foreign countries in the planning and performance of work both through CEMA, as well as directly with the scientific organizations and scientists in various countries.

The Institute of Physics and the radiation research sector are working with scientific organizations in the CEMA member countries on the development of new methods for transforming solar, chemical, wind and geothermal energy into electrical, heat and mechanical energy and creating highly economical installations on this basis. Our Institute of Mathematics is working with the Combined Center of Mathematics and Mechanics of the Bulgarian Academy of Sciences on research into the theory of functions of active and complex variables. Our Institute of Cosmic Research into Natural Resources is conducting joint research with scientific organizations in Hungary, the GDR, Cuba, Mongolia, Poland, Rumania and Czechoslovakia on the study of the Earth's natural resources using aero-cosmic methods. I want to note as well the work conducted by staff members at the Shemakhinskaya Astrophysical Observatory together with colleagues in the Hungarian People's Republic, the People's Republic of Bulgaria, the Polish People's Republic, CSSR, and the Socialist Republic of Rumania, on research into the physics and evolution of the stars, in addition to work with scientists of the Central Institute of Astrophysics of the GDR Academy of Sciences on research into magnetic stars. Under the leadership of O. Guseynov, doctor of physical-mathematical sciences, the Institute of Physics is conducting research into astrophysical phenomena of super dense (relativistic) stars in our galaxy. Catalogues, which are the most complete in world literature, of X-ray sources and "white dwarfs" have been created and published as separate books in Holland.

Interesting joint work is being done by researchers from the Institute of Zoology of our Academy and the helminthological laboratory of the Bulgarian Academy of Sciences, as well as by the institutes of zoology, soil science and agrochemistry, botany and geography, as well as the Institute of Ecolo of the Polish Academy of Sciences in accordance with the international "Man and the Biosphere" program.

All these facts testify that true science aspires to further progress in the name of peace, that the aspiration of scholars from various countries and continents for cooperation and exchanges is characteristic of our epoch--the epoch of the scientific and technical revolution--and that the scholars of Soviet Azerbaijan are making their worthy contribution to the total of the creative work performed by the world's scientists.

8543
CSO: 1814/27

- END -

END OF FICHE DATE FILMED

31 Jan 83